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I.

TREPHINING VERSUS IRIDECTOMY IN GLAUCOMA*.

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Von Graefe's discovery, in 1856, that the removal of a portion of iris tissue through a scleral wound would permanently lower tension in some glaucomatous eyes has made that year a notable one in ophthalmology.

Previous to that year every individual affected with this malady became blind unless death earlier terminated his existence. Inflammatory glaucoma had been known from antiquity as an incurable disease.

Mackenzie, recognizing the increase in tension as the overshadowing symptom of the disease, had attempted to relieve it by the most natural method of paracentesis of the cornea, but without obtaining any lasting result. The von Graefe operation has been frequently assailed, but has held its unique position for almost half a century, although the mechanism of its action was not known and it failed in some forms of glaucoma. De Wecker, believing that the beneficial action was due to the character of the scar formation in the sclera, which favored an extraocular drainage, advocated the operation of anterior sclerotomy.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22 and 23, 1915.

Following the lead of de Wecker, over thirty operations, mostly forms of sclerotomies or sclerectomies, with and without iridectomies, have been described. One of these recently devised operations has already attained a position of general recognition. Its favorable reception is due to several causes.

First, it has merit. It will reduce tension where iridectomy has failed or would fail.

Second, it is technically not a difficult operation to perform.

Third, Colonel Elliot, himself an operator of large experience, personally demonstrated it in several of our large cities and before our ophthalmic societies in 1913.

During the wave of enthusiasm which followed his visit many of us believed, as someone has said, that "the sun was setting for the operation of iridectomy."

In an address delivered before the Pacific Coast Oto-Ophthalmological Society, in Seattle in 1914, Colonel Elliot said: "There are only two forms of glaucoma in which I hesitate to advise trephining. These are: First, glaucoma secondary to cataract associated with a fluid or semifluid opaque lens, and second, conditions (traumatic) in which there is known to be a free communication between the aqueous and vitreous chambers. If these two be put aside, there is no form of glaucoma, from the very chronic to the most acute, which cannot, and in my opinion should not, be treated with the trephine."

It may appear presumptuous to question this operator, who has performed the operation more than a thousand times, but has not his enthusiasm carried him too far? We know there are a variety of causes for secondary glaucoma, and by analogous reasoning must believe there may be a variety of causes for primary glaucoma. But whatever the cause, plus tension must be relieved.

If the Elliot operation were devoid of danger there might be some excuse for its universal adoption for all forms of the disease, for it naturally is effective in lowering the tension. But there appear to be several serious objections to it. Most important is the danger of late infection. How frequently this occurs is scarcely known as yet. Some operators of large experience report no cases. Elliot himself says he has not known of any, after performing five hundred operations. Knapp reported two out of fifty cases. Miller reports one and three-tenths per cent in three hundred and eighty-nine Lagrange sclerectomies and none in one hundred and seventy-eight Elliot operations. Other writers have reported a number of single cases of late infection. De Schweinitz has had no purulent infections in eighteen cases; but has seen it in the practice of others. He stated that iritis occurs with irritating frequency.

A certain degree of reaction has undoubtedly set in, as operators have had more and more experience with this operation, and I believe that I voice the opinion of many ophthalmic surgeons in advancing the dictum that iridectomy is still the operation of choice for glaucoma, and trephining and other methods of extraocular drainage are operations of necessity.

It must also be remembered that we are comparing an operation six years old with another fifty-three years old. Where the Elliot operation will stand a half century from now, one may not venture to predict, but it is extremely doubtful if it will maintain its position so well as iridectomy has done. Besides, the trephining operation includes in nearly every case a small peripheral iridectomy, which Elliot claims is only to avoid prolapse, but which is no doubt in itself beneficial in many cases and will explain the relief of tension in those cases in which the fistula closes and extraocular drainage becomes occluded. On account of the location of the trephine opening, the iris is excised near its root, which is most effective in securing intraocular drainage.

The principal indictments against iridectomy are difficult technic, production of corneal astigmatism, and failure to reduce tension.

The charge against trephining is hypotony, late infection and iritis. To a certain degree we can tell what to expect from an iridectomy. In acute inflammatory glaucoma a properly performed iridectomy gives immediate and permanent relief. In most cases of the subacute variety this statement is also true. In the chronic simple variety, and in the far advanced cases of all varieties, iridectomy is often a failure. These are cases in which structural changes are far advanced. The iris is atrophic. The vascular system is sclerosed. The cribriform ligament is atrophic. There is little or no chance to secure drainage through the iris vessels or through the spaces of Fontana. Here, then, is the field for trephining.

An examination of some cases of glaucoma furnished no clew as to what to expect from an iridectomy. In such cases are there any objections to the performing of the iridectomy with the expectation that later, if tension is not altered, the trephining operation can be performed over the site of the coloboma? Or, what I believe is better still, a trephining with iridectomy can be done below.

In the discussion of Dr. Gradle's paper on this subject one year ago before the Ophthalmic Section of the Illinois Medical Society, I suggested two iridectomies where one had failed, and cited a case brought to a successful issue by such procedure. I have during the year attempted this again, but later resorted to the trephine. Tension was reduced by the second iridectomy ten millimeters; but as it was still thirty-five millimeters, it became necessary to trephine. Following the last operation, performed on the 19th of March last, tension has remained at seventeen millimeters. This case would have been better trephined from the start, as there was some loss of vision between the two operations.

In 1905 I performed iridectomy in a case of chronic simple glaucoma with useful vision. The other eye, being blind from the same cause, was not operated upon, although the tension was high. Eight years later this man returned with exactly the same vision and the same field which he had at the time of iridectomy. The tension in the blind eye being high, Dr. Remman performed an Elliot operation. This case was included in the twenty cases of trephining reported by Dr. Remman at the Chattanooga meeting of the Academy in 1913. Tension has remained reduced up to the present time. In this case both operations were highly successful.

One of the other cases reported by Dr. Remman was on a colored girl, ten years of age. I performed an iridectomy upon one eye and Dr. Remman a trephining upon the other. As long as this girl was under our observation the eyes maintained the same relative degree of tension. That is, the tension was lowered in both operations and exactly in the same amount.

Fuchs says: "Views differ in regard to the efficacy of iridectomy in glaucoma simplex. Von Graefe estimated the number of definitive cures produced by the operation at rather more than half the cases; in one-quarter of the cases relapses occurred, which were cured only by a second iridectomy, while in the rest of the cases blindness gradually set in, in spite of the operation. Only in two per cent of all the cases did the operation have actually a bad effect. Since then reports in regard to the curative effects of iridectomy in glaucoma simplex have been published by different authors, as by Hirschberg, Sulzer, Nettleship, Charles Stedman Bull, Gruening, etc. Most of these statistics prove, in harmony with the statements of von Graefe, that in about half the cases the operation has put a stop to the progress of the disease. Dr. Laska has collected my own observations upon this point, and from them the following results have been obtained: Out of thirty-nine cases, iridectomy had a favorable result in nineteen—that is, in about one-half—the sight either being kept stationary or actually improving; but in twenty cases the eyesight failed, in spite of the operation, either from the subsequent reappearance of the elevation of tension, or even without this taking place. The value of these statistics, small as they are, lies in the fact that only cases that had been under observation a pretty long time were accepted in making them up. The mean period of observation amounted to five years in the nineteen cases that were cured; several of these had been followed up for more than ten years."

Secondary glaucomas are very common and due to a great variety of causes. Colonel Elliot would perform the trephining in every case except the conditions mentioned above. Following this idea, I have seen the trephine operation done in annular posterior synechia, and naturally without result, as the trephine opening being small and the pupillary margin of the iris adherent to the lens, no iris was removed. Subsequent iridectomy was successful in lowering the tension.

Anterior synechia is frequently a cause of glaucoma following ulcers, operations and traumatisms. Here iridectomy is indicated.

The secondary glaucoma which occasionally follows cataract extraction is of especial interest and importance. It may occur soon after the extraction, or after complete recovery, or after several years. No particular method of operating is entirely free from this complication. It may follow simple extraction, the combined operation, the preliminary iridectomy, and also extraction in the capsule.

Many of these cases reveal entanglement of the iris or capsule in the scar or obstruction of the pupil by membrane or exudate.

In apparently perfect simple extractions, examination with the loupe may disclose peripheral adhesions of the iris to the corneal wound. This is the rule in the combined operation.

Microscopic examinations of the sections of the eyes enucleated after unsuccessful cataract extractions frequently show how entanglements of the capsule may by contraction cause compression of the filtration angle even in the opposite parts of the circle. An early severing of these bands would lower the tension. Many cases of glaucoma due to adhesions of the angles of the cut iris have been relieved by iridectomies in these locations.

I believe Colonel Elliot's indications for the trephining operation should be narrowed to cases in which iridectomy has failed, to congenital glaucomas, to glaucomas secondary to cataract extraction which do not show on examination with the loupe any anterior synechia or membrane in the wound or pupillary area. Such cases may be those which would have developed glaucoma anyway, or cases in which the vitreous has occupied the anterior chamber, or cases in which epithelium has followed the wound into and filled the anterior chamber.

I have personally performed the Elliot operation sixteen times in various forms of glaucoma and in various stages, and have had personal observation of most of the twenty cases reported by Dr. Remman, and am convinced that it is an operation of great value. However, I feel that more time and the experience which goes with it may still further assist us in making a correct comparison of these two important procedures.

Certainly there are weighty objections to the permanent fistula. We know what it does to a nonglaucomatous eye, and we try to avoid and to cure it if it is present. To these serious objections iridectomy is comparatively immune. Its serious fault is failure in a certain number of certain varieties of glaucoma.

We may be justified in doing this operation and that operation in eyes blind from glaucoma; but in eyes with vision, and that vision failing from plus tension, I know of no other situation which calls for such a degree of unbiased judgment in determining the procedure which offers the best chance of success.

My conclusion, therefore, is a suggestion for a careful study of the individual case, using the operation of iridectomy where there is a reasonable chance of success, and resorting to the trephine in case of necessity only.

II.

REPORT ON A GOLD (MULE-SHOE) DRAIN FOR CHRONIC GLAUCOMA—NEW METHOD TO AVOID USUALLY EMPLOYED FLAP.*

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Springfield, Ill.

I am pleased to have this opportunity to present the results of some observations I have made regarding the drainage of the aqueous humor by means of a type of gold drain, which consists of a ring of 24k gold, two and one-half millimeters in diameter, made of wire No. 30, B. & S. gauge, equaling ten one-thousandths of an inch, extending from which is a toe one and one-half millimeters long, bent at a right angle, to occupy and prevent the closure of a trephine opening; shape of toe, inverted keystone.

It goes without saying that the use of this "mule-shoe" type of drain, the shape of which suggests the name, is not intended for acute glaucoma, iridectomy having been universally regarded as the classic operation for this condition, ever since its original suggestion by the immortal von Graefe; but up to the introduction of the trephine, chronic glaucoma may well have been considered the bete noire of the oculist.

Then came sclerotomy, cyclodialysis, the Lagrange, and finally, the perfected technic of the operation with the trephine by Elliot and Fox, which gave me new inspiration, and to the credit of which, I may say that I have had a larger proportion of successful results than has been my lot following any other course.

Still, I am pained to acknowledge that I have had a number of cases of glaucoma simplex in which I have performed a trephine operation which was temporarily followed by typical drainage with the appearance of conjunctival edema and reduced tension, and which ultimately were a source of disappointment.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22 and 23, 1915.

I have talked with other operators who have done a large number of classic trephines, and who have had the opportunity of witnessing the results of other successful operators, and the consensus of opinion is that a considerable number of the cases sooner or later fail to drain.

If this were not so, there would be no justification for the operation of Zorab, who introduces a thread through a keratome incision, or the operation of Casey Wood, shown before the Eye, Ear, Nose and Throat Section of the Illinois State Medical Society. It was while considering the method of Casey Wood that the following questions presented themselves to my mind, the final decisions regarding which will require the experience of a large number of operators, extending over considerable time. I shall be satisfied if my observations awaken an interest in the general question of metallic drainage.

Without attempting a final answer to any of these questions, I will list them as follows:

1. Are any of the operations at present performed satisfactory?
2. Is thread a satisfactory material for aqueous drainage?
3. Would a gold plate, interposed between the lips of a keratome incision, or occupying a place in a trephine opening at the limbus, be resented by the tissues?
4. Would a wire of pure gold ten one-thousandths of an inch thick, occupying the subconjunctival area adjoining the limbus, interfere with the nutrition of the superimposed conjunctiva?
5. Would the interposition of a plate of gold in the healed incision secure permanent drainage of the aqueous humor?
6. What is the relative advantage between a gold drain in a keratome incision and one occupying a trephine opening?
7. Is it unwise to make a conjunctival flap extending to the cornea in the operation of trephining, and how can it be avoided?

Answer 1.—My experience, and that of all others with whom I have compared notes, and the published observations of Zorab, Wood, Mayou and others, justifies an answer in the negative.

Answer 2.—I have had occasion in a number of instances to observe portions of thread which were left under the conjunctiva following operations for strabismus, which became the center for the accumulation of exudate, and in one case developed a very pronounced pterygium. The albuminous material occupying the spaces in a thread forms a culture medium for germs which are almost impregnable to phagocytes, making it essential to exercise absolute precaution in all operations for the introduction of a thread drain. Should residual germs develop at the site of a thread drain and require removal, it would be exceedingly difficult, if not impossible, to avoid the danger of infecting the interior of the eye.

Answer 3.—Regarding the toleration of gold between the lips of an incision in the cornea, or in a trephine opening, I can report on the introduction of eighteen gold drains in human eyes, in no one of which has there been any indication that the presence of the foreign body was resented by the tissues. I have introduced drains of various sizes, made of plates and wires, in the occupants of my kennel, and in no case has there been any symptom indicating that they were not being kindly tolerated by the eye. I have here a specimen of a dog's eye which has carried a gold plate introduced through a keratome incision six weeks ago, and you will see it is bright and untarnished. Dogs are poor subjects for the exercise of antiseptic precautions, and none were attempted further than the preliminary sterilization of the materials used.

Answer 4.—Concerning the behavior of the conjunctiva overlying the circular portion of the drain, there is a story to relate.

While canvassing the merits of the various metals which were worthy of consideration as a substitute for thread, two emergency cases of glaucoma presented themselves within the space of a few days, and these were followed by others in which the same type of drain was thought to be admissible.

First.—Mr. Post, of Virden, Illinois, had been having a very serious time with herpes, which terminated in erysipelas, and confined him to his home for a period, during which he developed what I infer to have been an acute glaucoma. When I saw him, some weeks later, he had great pain, high tension, and haziness of the cornea. I considered it quite justifiable to make an observation on the behavior of a gold drain inserted into a trephine opening. Accordingly, I called on a jeweler to draw a gold wire to the size of a No. 20 gauge, which was the smallest he had, and make a ring with an extension, or toe, turned at a right angle, one and one-half millimeters long. I placed this extension in the trephine opening at the limbus, and covered it with the usual flap. The pain and congestion, which were extreme before the operation, abated rapidly, and at the end of ten days he was able to go home and report at intervals of a week. Upon his return the haziness of the cornea and the congestion of the eye had improved, but he showed a disinclination to raise the upper lid. The tension was normal, and he felt no irritation whatever from the presence of the wire. At the end of the second week the condition was the same, except that it was noticeable that the wire was more plainly visible. After six weeks the wire became exposed at one point, but its presence produced no irritation which could be distinguished by the patient, although he was disinclined to raise the upper lid. Upon being asked if he felt anything in the eye, he invariably answered "no." Subconjunctival drainage was indicated by the presence of edema of the conjunctiva. At this juncture I decided to remove the wire drain, which seemed most likely to be the cause of the irritation. The removal of the wire drain was followed by the immediate emptying of the anterior chamber, which, however, promptly refilled. During the following two weeks the ptosis disappeared and the tension remained normal. At the last tonometric reading it was twenty-one millimeters.

Second.—Mr. Tilley, of Pawnee, Illinois, was brought to me suffering extreme pain in an eye which had been glaucomatous for a considerable time, but which had never given him much trouble, the remaining eye being unaffected. Tension, fifty-eight millimeters. Vision too poor to get field. Congestion great. A repetition of the same operation performed on Mr. Post was determined upon, and executed without delay. The case of Mr. Tilley improved more rapidly than that of Mr. Post. At the end of a week he had no pain, normal tension, and very little congestion; yet some appearance of ptosis. He returned home at the end of a week and has reported at intervals of a week since that time. He is absolutely unconscious of pain or irritation from the presence of the wire after eight months (the date of this publication).

Third and Fourth.—Two drains of the same type and size were inserted in a very chronic case of glaucoma, which had

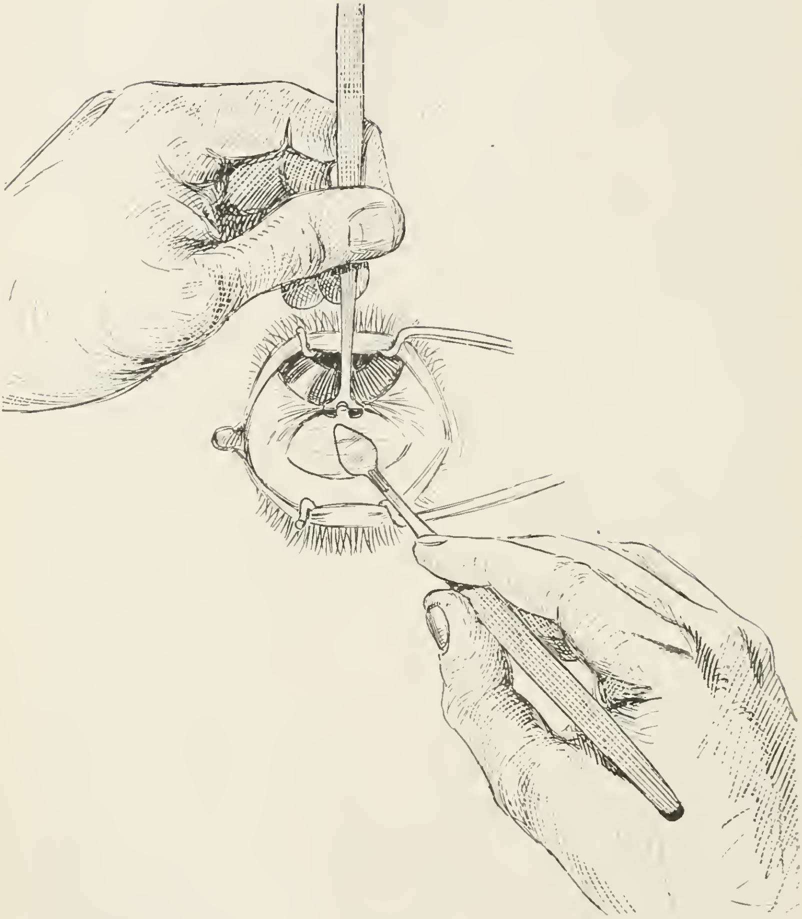

FIGURE 1.

Showing conjunctival retractor and dissecting keratome undercutting the epithelium to admit the trephine directly over the limbus. The capsule of Tenon is opened anterior to the attachment of the rectus and drawn forward with the conjunctiva. Both of these tissues overlie the drain when it is in position.

had repeated iridectomies on both eyes, until there was scarcely enough conjunctiva left to cover the drains. These acted in the same manner. Although partly exposed, they were not resented by the tissues. They were introduced in the lower quadrant. Subsequently after their introduction the tension was normal to touch.

These experiences gave me a great deal of confidence so far as the tolerance of the drain was concerned, but I became convinced that the size of the wire, twenty-thousandths of an inch, was too great. At this juncture I changed the type of the drain to a wire ten-thousandths of an inch thick, and none of these have cut through the conjunctiva.

Answer 5.—Relative to the question of the permanency of drainage of the aqueous humor, as influenced by the interposition of a gold wire in the healed incision, I will ask for more time before venturing a final answer. We know that temporary drainage results from the introduction of artificial drains, and we know that nature has made provision for obstructing the excessive drainage of the aqueous humor.

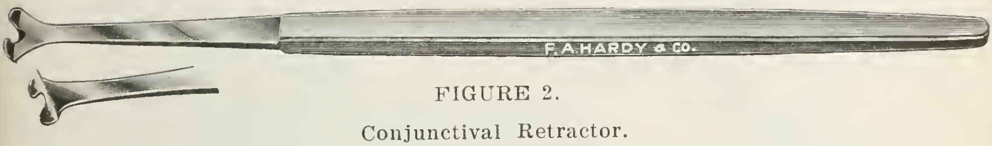

FIGURE 2.

Conjunctival Retractor.

Nature has made a wonderful provision for the protection and closure of wounds in the eye. This is apparent in the operation for cataract. We cut off half the cornea, leaving a narrow conjunctival flap. What is to prevent the continued escape of the aqueous humor?

Nicatti solved this problem about thirty years ago, when he made the accidental discovery that there was a provision made for just such a contingency. He was examining on a microscopic slide the evaporation of aqueous humor which he had obtained from the eye of a rabbit. He observed nothing more than the usual formation of crystals of chlorid of sodium. Desiring to continue his observations, he repeated the paracentesis on the same eye. While he was looking for the formation of crystals, what he saw surprised him greatly. The appearance of the field of the microscope was that of a

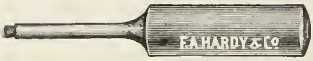

FIGURE 4.

Trephine.

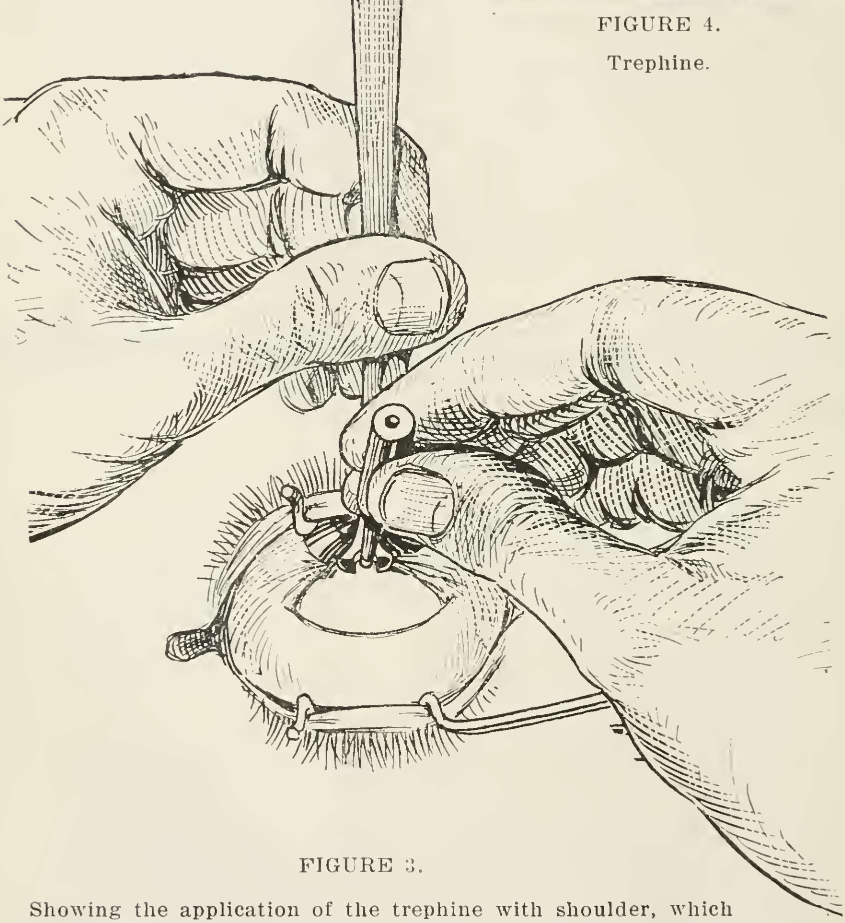

FIGURE 3.

Showing the application of the trephine with shoulder, which should rest on the footplate of the retractor, by which the penetration should be limited to one and one-half millimeters. (Cut is defective in that it does not make clear the shoulder of the trephine.)

badly battered bird's nest. He continued his observations and gave to the world the discovery that, while under normal conditions the aqueous humor contained only normal salt solution, yet, under conditions of diminished tension, there is a provision in the gland which supplies the aqueous humor, by which fibrin is secreted to seal the wound, in the same manner as the fibrin of the blood forms a clot to prevent loss of life from a bleeding wound. It takes about twenty minutes for the coagulated aqueous humor to glue down the conjunctival flap and permit the anterior chamber to fill, thus restoring the form of the cornea. This aqueous humor organizes with

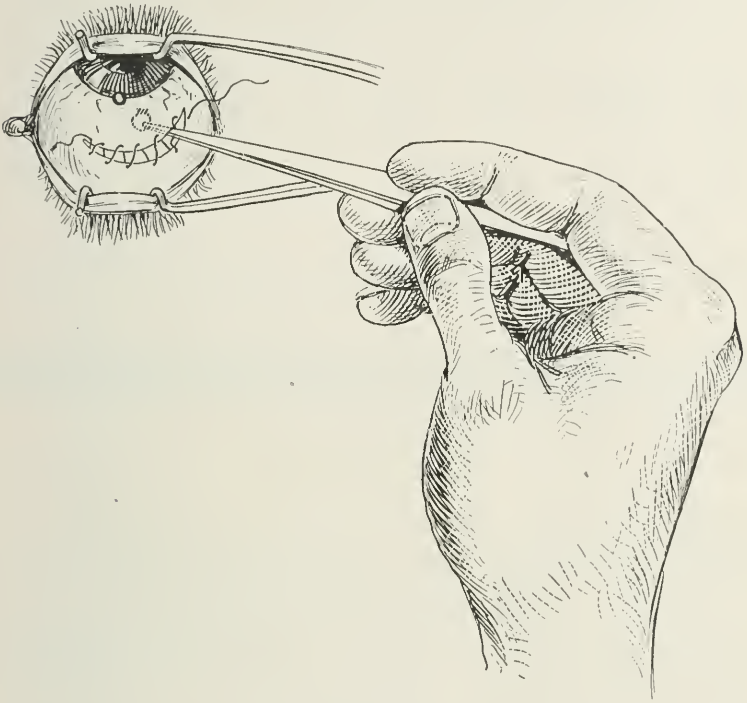

FIGURE 5.

Showing location of the incision and method of suturing same. The toe of the drain is usually inserted before the capsule and the conjunctiva are replaced, but may be inserted after suturing the flap as shown. (The relative size of the drain is exaggerated.)

the formation of a cicatrix, and the damage is repaired. After the anterior chamber is established the fibrin disappears from the aqueous humor, but reappears to close a wound whenever one is made—as in the repeated draining of the anterior chamber by paracentesis in the treatment of an ulcer.

To return to the case of a leaking trephine opening which is saving the eyesight by drainage. It is reasonable to suppose that at any time excessive lowering of the tension might invite a fibrinous aqueous clot, stop the opening and destroy the drainage. If a remnant of capsule or iris in the wound will drain the eye, and prevent the formation of a clot of aqueous humor from obstructing the outlet, which is often observed, may we not presume that a polished surface of gold will serve the same purpose? We know that it will serve for a time: why not indefinitely?

The same line of reasoning would apply to the formation of an exudate in the trephine opening, or the formation of the epithelial obstruction, which is said to be one of the sources of failure of permanency in the trephine operation.

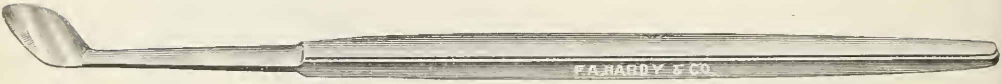

FIGURE 6.

Dissecting Keratome.

Answer 6.—The determination of the comparative advantage between a gold drain in a keratome incision and one occupying a trephine opening will demand more time and considerable disinterested observation. Thus far most of my experiments and operations have been made with the idea of making the drain auxiliary to the trephine, and I have but one experience relative to the behavior of the wire drain that may be of even more value when made auxiliary to the typical iridectomy.

The case referred to is that of Mrs. Crabb, who became blind in the right eye, and did not discover it until the vision of the left eye had become reduced to 20/30, with a contraction of the field of vision for white to thirty degrees. For years she had had spells of intolerable headaches, centered in the eyeballs, which she now feels sure were attacks of glaucoma. When I first saw her the excavation of the papilla of the right (blind) eye was very deep, while both eyes were equally hard to the touch—plus two.

I decided, as a measure of safety, to introduce through a keratome incision a drain in the right (blind) eye, with the toe at an oblique angle, and be guided by the results before operating on the left eye. The operation was satisfactory, but the tension did not drop immediately, which led me to the decision to make a trephine opening with an auxiliary drain in the left eye.

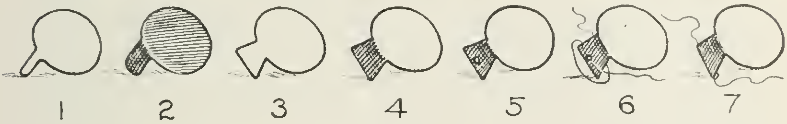

FIGURE 7.

Showing evolution of the "mule-shoe" drain.

No. 1. Condemned on account of the wire having been too thick, causing it to wear through the conjunctiva; also the toe was too straight, hence was not self retaining.

No. 2. Condemned on account of the fact that it was made of a thin plate of gold, which was found to cut out. This was the cause of censure of the only patient in the series of eighteen who were treated by the introduction of the "mule-shoe" drain.

No. 3. Condemned on account of marking the introduction of the keystone shape of the toe, which is found to be self retaining.

No. 4. Condemned on account of the increased drainage area furnished by the solid toe. The wire is ten one-thousandths of an inch thick, the smallest size of wire obtainable; the circle is two and one-half millimeters in diameter; both dimensions of the toe are one and one-half millimeters.

Nos. 5, 6 and 7 have not been tried out by the author, but indicate the possibility of combining a thread with the metallic "mule-shoe" drain.

No. 4 is the present choice of the author, and may be obtained from the Springfield Optical Company, Springfield, Illinois; F. A. Hardy & Company, 10 South Wabash Ave., Chicago; and V. Mueller & Company, 1776 Ogden Ave., Chicago. Price, fifty cents.

In the case of the right eye, after six days the tension was thirty-five millimeters; not very encouraging for the plate drain in the keratome incision. However, after ten days the drainage was perfect and the tension normal. After twenty days the patient was seen, and it was discovered that the drain had worked out and that the tension had risen to thirty-five millimeters. I regarded this issue as rather fortunate, since there was no vision at stake.

In the case of the left eye, I introduced a drain auxiliary to a trephine, and she now has normal tension and improved vision—20/30 plus.

Answer 7.—Regarding the necessity of a conjunctival flap. In the operation for trephining, as described by most writers, it seems to me that there is an unnecessary amount of traumatism in making a conjunctival flap by extending the incision from the cornea and back to the cornea again.

In my recent operations I have made a circular incision eight millimeters from and parallel to the cornea. The conjunctiva permits itself to be retracted sufficiently to enable one to introduce the keratome or undercut the cornea for the introduction of the trephine at the limbus, and the wound may be closed by one "overcast" suture, requiring no knots. (Fig. 1.)

Following this plan the conjunctiva near the cornea is not injured, and infiltration is not impeded. Furthermore, if it were ever desired to make a second trephine opening, it could be placed in position very close to the location of the former.

APPLICATION OF THE TREPHINE.

It is found of advantage in the retraction of the lower edge of the incision in the conjunctiva, and in undercutting the superficial layers of the cornea, and in applying the trephine, to use a special retractor with a perforated plate one millimeter thick, resting on the cornea, which serves as a guide to the dissecting keratome, and also as a guard to arrest the shoulder of the trephine. In the use of this retractor one may have no fear lest he cut too deep, for the shoulder of the trephine comes against the plate of the retractor, which limits the depth of the cut to exactly one and one-half millimeters. The author prefers in all cases to make use of a trephine having a cutting diameter of one and one-half millimeters, which is amply sufficient to admit of the removal of a portion of the iris, which is done in every case.

CONCLUSIONS.

Trephine openings fail to drain from three causes:

They may be plugged by a clot of coagulated aqueous humor.

They may be obstructed by organized exudate.

They may be blocked by the accumulation of epithelium.

A thread seton has physical objections which make it take a second place in comparison with gold; biologic objections which make the wisdom of using it questionable in the drainage of aqueous humor.

Gold is preferred for the following reasons:

It is not resented by the tissues.

Does not gather residual germs.

May be rendered so thin that its presence is unnoticed.

Will prevent the lips of the wound from adhering.

Will probably insure permanent drainage.

A gold ring with a solid toe serves better than a plate, which is found to cut out.

The traumatism resulting from the making of flaps in the execution of the trephine operation may be avoided by making an incision in the conjunctiva parallel and remote from the margin of the cornea, which may then be retracted sufficiently to undercut the cornea and apply the trephine at the limbus. This incision possesses the additional advantage that it may be closed by a socalled "overcast" suture, the friction of which alone holds the edges together for a sufficient length of time without the use of knots.

The above notes are offered as suggestions only, but with the hope that they may prove useful in stimulating further investigation.

III.

CONCERNING THE SURGICAL TREATMENT OF RETINAL DETACHMENT.*

Edgar S. Thomson, M. D.,

New York City.

The surgical treatment of retinal detachment has in the main two distinct ends in view: first, the removal of the subretinal fluid, and second, the formation of adhesions between the retina and the underlying choroid. Whatever may be one's special preference for the various theories which have been enunciated as to causation, it is difficult to escape the feeling that surgical treatment alone offers any prospect of success in this intractable and serious condition. The present author has had not the slightest measure of success in any form of medicinal treatment, including rest, diaphoresis, either by hot packs or pilocarpin injections. or any of the various methods of subconjunctival injections. The vast majority of surgical procedures have come and gone, leaving no fixed methods or principles behind them, so that it is with a due sense of the difficulty of the subject and the paucity of the results obtained that I bring before you a contribution to the study of one of the latest methods of operative treatment—trephining of the sclera.

The first rational operation for retinal detachment was simple puncture of the sclera, which, according to Casey Wood.[1] was first practiced by James Ware in 1805. This operation aimed simply at the evacuation of the subretinal fluid. In 1863 von Graefe practiced incision of the detached retina so as to allow the fluid to escape more freely. This was also done by Bowman. Later de Wecker devised a trocar to be used in tapping the subretinal sac; and Galezowski aspirated, or suggested the aspiration of the postretinal fluid with a modified Dieulafoi syringe. In 1871 Meyer endeavored to pass a suture through the retina and draw it fast to the sclera. In 1882 de Wecker and Masselon employed the galvanocautery, which was thrust completely through the sclera. This form of treatment was intended to bring about an adhesive inflammation between the choroid and the replaced retina. In 1886 Fano proposed that an irritant fluid be injected into the sac to set up an adhesive inflammation; and in 1890 Schöler reported twenty-six cases in which he had made injections into the posterior chamber of a few drops of iodin. In 1895 Deutschmann proposed his bisection operation, which was intended to apply to acute cases as well as to the more advanced cases in which a certain amount of permanent shrinkage of the retina had taken place. This operation evacuates the subretinal fluid, divides the retina so as to allow it to fall back, and, according to the author, produces small inflammatory or exudative adhesions between the choroid and retina. He further injected animal vitreous into the vitreous cavity, so as to press the retina back in place. In 1903 Müller advocated resection of a portion of the scleral wall, so as to secure permanent drainage. Those who are interested in the further aspects of the subject from the historic standpoint, are advised to consult Casey Wood's admirable résumé of the subject, as above quoted.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22 and 23, 1915.

To sum the matter up, we have, as before stated, two principal things to accomplish by surgical intervention: first, the removal of the fluid, and second, the formation of adhesions between the retina and underlying tissue. Viewed in the light of past experiences, as well as by a priori reasoning, the attempt to secure adhesive inflammation seems of doubtful value. Plastic formation in the retina is of such low grade that it is difficult to rely on this factor; and certainly those who have attempted to secure inflammatory reactions have failed to establish a method of permanent value. With the bisection operation of Deutschmann the author has no experience, and it may be at once stated that the special method proposed in the present paper is intended to apply mainly to recent cases.

It will be generally conceded that scleral puncture has held its own better than almost any other surgical procedure, and it seems probable that the evacuation of the subretinal fluid is the correct principle upon which to build for the future. Certainly, according to Vail's recent published statistics,[2] it is the operation of choice among American ophthalmologists. One must perforce be struck by the fact that there is no tendency for the subretinal fluid to absorb of its own volition, except in very rare isolated cases, and the probability is that for a certain period the subretinal and suprachoroidal fluids continue to increase. It is, therefore, desirable not only to completely drain away the fluid so that the retina may fall back into position and the vitreous body be restored in volume, but also to secure more or less permanent drainage so that reaccumulated fluid may not annul the effect of a previously successful operation.

Holth[3] reports six cases of detachment of the retina in which the sclera was trephined without evacuating the subretinal fluid. He reports a temporary favorable effect in all, and a permanent favorable effect in four of the cases. Holth credits the technic performance of the operation to Argyll-Robertson in 1874, although he says it was done at that time for glaucoma absolutum. Holth uses a two and one-half millimeter trephine, and raises up a flap of conjunctiva and episcleral tissues, after which a scleral button is removed and the flap sutured back into place without injuring the choroid.

In 1913 Holth[4] further reported that he had observed the eyes already operated on, and had also performed the same operation on a number of other eyes. In eleven cases in which retinal rents existed, no permanent improvement was secured, but in five cases without retinal rents, the retina became completely reapplied. In Holth's opinion the prognosis is most favorable in the flat detachments where a tear can be most reliably excluded.

Walter R. Parker[5] reported a successful case. He trephined the sclera and incised the choroid and retina. "The operation was followed by a free discharge of a straw-colored fluid and a small amount of vitreous." It must, however, be stated that in this case a double neuroretinitis existed, and it is probable, where inflammatory conditions of this nature exist, that the type of case is not so serious as in the ordinary spontaneous detachment. At the June meeting of the American Medical Association Parker reported eleven cases, with very good results in three cases. The histories are given in detail, and the results are summarized as follows: Vision improved, four; unimproved, five; made worse, two. Fields improved, eight; made worse, three. Parker almost invariably incises the choroid, or the choroid and retina, with a cataract knife, allowing a few drops of vitreous to escape.

In September of 1914, Dr. T. H. Curtin of New York and the writer conceived together the idea of associating the trephine method with a simultaneous or subsequent aspiration of the subretinal fluid. The idea was to secure drainage over a prolonged period of time, and to remove the fluid with as little traumatism as possible, so as not to have any new inflammatory tissue around the scleral opening which might subsequently block it up. It is, of course, not definitely known whether a trephine opening will remain free indefinitely or not, but, according to Elliot's experience in trephining for glaucoma, the evidence seems to indicate that the opening will remain free for months, perhaps even for years, and, as far as the treatment of detachment is concerned, this has its obvious advantages.

The technic followed in thirteen cases, recently reported at the meeting of the American Medical Association, was practically the same as Holth's, as far as the removal of the scleral button is concerned. Holth, however, considers that it is proper at times to enlarge the scleral opening with scissors. We do not like to interfere with the scleral opening in any way whatsoever, for the reasons already given. A scleral button is removed with the slightest possible traumatism, as nearly over the center of the detachment as possible. If suprachoroidal fluid escapes in any great quantity, and the ophthalmoscope shows that the detachment has gone down, the conjunctival flap is replaced and nothing further done for the time being. If little suprachoroidal fluid escapes, the needle of an aspirating syringe is carefully pushed through the choroid and as much fluid as possible is aspirated. The conjunctival flap is then sutured into place and the operation is terminated. If no aspiration has been done at the time of the trephine operation, it is done about ten days later when the reaction has completely subsided. A small aspirating needle is passed through the conjunctiva, the scleral opening and choroid, and as much of the fluid as possible is withdrawn. This operation can be later repeated if necessary, as it is followed by almost no reaction, and, as before stated, it accomplishes the removal of the fluid with the least possible traumatism of the choroid in the trephine opening. We feel that any escape of vitreous, or wounding of the retina, is undesirable, as such a condition must certainly lead to adhesions and more or less blocking up of the permanent filtration.

In brief, then, the idea has been to get rid of the suprachoroidal fluid primarily, and secondarily to forcibly aspirate the subretinal fluid as completely as possible, so as to allow the retina to reassume its normal position. The filtration through the trephine opening may then prevent more fluid from accumulating, and forcibly separating the retina from its position secondarily. If certain of the theories in regard to the circulation of the vitreous prove to be true, and the vitreous circulation is in reality very much altered, then it must be admitted that there is an important factor which this operation does not take into account; but it has seemed to us that not only is there no proof of an altered constitution of the vitreous, but that clinical evidence goes far to show that the vitreous may, without much difficulty, reassume its normal volume after replacement of the detachment. As is well known, detachment of the retina leads to marked degenerative processes, with thickening and contraction of the detached area, so that not only is the perceptive power of the retina lessened, but it sooner or later becomes shortened so that the mere withdrawal of the fluid cannot suffice to replace it; so that our idea has been to remove the fluid early, before degenerative processes of the retina have begun, and before the light perception has become too much diminished.

In high degrees of myopia, whatever the cause of the detachment may be, the lack of extensibility of the retina makes such an operative procedure as is at present under discussion of very doubtful advantage. Holth considers that the trephine opening allows a certain amount of shrinkage of the eyeball, and mentions two cases in which trephining was done in high myopia without any detachment being present, simply in order to reduce the refraction, which, he says, was successfully accomplished. Upon this point we are unable to speak with authority; but there is no question that the small, recent, single detachments without rents are much the most favorable for this present operation.

A word is necessary with regard to retinal rents. Whatever may be our views of the pathology of the detachment of the retina, there is no question that the presence of a rent is a very unfavorable complication. Holth operated on eleven cases in which retinal rents existed. None of these eleven cases was cured. There was either no effect, or but slight improvement. Probably the free interchange of fluids between the vitreous and the subretinal space through the rent is a great disadvantage.

In discussing the results obtained from this method of procedure, it is well to emphasize the fact that no result can be considered of much value unless by far the greater part of the retina is completely reattached. In our experience, if anything but a very small area around the trephine opening remained unattached, the recurrence of the detachment was fairly rapid. It is not sufficient, therefore, to secure an improvement of the vision and field merely by a lessening of the size of the detachment. The retina must be almost completely reattached to secure any result of value. In practically all of the cases operated on, we have secured encouraging improvement at first, but if a detachment of any size remained, it soon increased and the results were not permanent. In speaking of results, therefore, it must be borne in mind that results of any degree of permanency can be expected only under favorable conditions. Three cases, which have been reported at the American Medical Association, were so recent as to justify us in the hope that we might secure some result.

In one case, a spontaneous detachment in a man of twenty-one years, including almost the lower half of the retina, but without demonstrable rent, a trephine operation was done by Dr. Curtin, followed by an aspiration ten days later, with resulting perfect vision. This was done in September, and there has been no subsequent recurrence. There is a very small area of detachment around the trephine opening which does not seem to enlarge. The tension of the eye continues soft, and the trephine opening can be clearly seen underneath the conjunctiva.

The second successful case was a traumatic detachment in a man aged twenty-three years. This was a single bleb, without demonstrable rent in the upper and outer field, and complete reattachment was secured with vision of 20/70. The macula was not involved, and the cause of the reduced vision was a curious type of old retinochoroiditis, apparently of long duration.

The third case, a spontaneous detachment in a man aged forty-two years, consisted of two large sacculated spots in the lower part of the field without demonstrable rent. Aspiration only partially replaced the retina in this case, and redetachment occurred early. A second aspiration was followed by subsidence of the detachment, but later a vitreous hemorrhage occurred which is slowly clearing, so that the final result cannot as yet be given, though this case will probably be a failure.

A fourth case was a woman, fifty-seven years old, with a single spontaneous detachment of the upper part of the retina and a large peripheral rent. In this case it was difficult, on account of the situation of the detachment, to aspirate satisfactorily. Only a few drops of fluid were removed, but the retina fell back into place, except in the neighborhood of the rent, but in ten days redetached. Scleral puncture, evacuating about forty minims of fluid, was later performed, and the retina fell back into position except in the neighborhood of the rent, and again detached after ten days. The appearance of the rent in this case left little doubt that a free interchange of fluid was going on between the subretinal space and the vitreous.

The remaining thirteen cases were all old—some with high degrees of myopia or old inflammatory changes—and no results of value could reasonably be expected, and none were obtained. However, in all of the cases, with one or two exceptions, the field of vision increased after the operation, but the amount of detachment remaining was so large that it is questionable if the improvement could be maintained. In a number of the cases the detachment became worse in a few weeks.

Concerning the technic of the trephine operation there is little to say, as it does not vary materially from the lines already laid down. The conjunctival flap should be taken up with great care and a suture placed in the summit immediately, so as to retain the conjunctiva and capsular tissues together as far as possible. A two or three millimeter trephine is used, and great care is taken not to injure the underlying choroid when removing the button, for the reasons already given. If the aspiration is done immediately, some care is necessary to avoid puncturing the retina and causing a bead of vitreous to present. The needle should be carefully thrust back into the middle of the detachment and the fluid aspirated as long as the piston of the syringe works easily. If there is the least difficulty in withdrawing the piston, it indicates that the retina has come in contact with the point of the needle, and the needle should be at once withdrawn slightly, or its position shifted, so as to avoid puncturing the retina. It is best to use a fairly long needle (one inch or one and one-half inch), and it must be remembered that through the pupil the detachment seems much nearer the observer than it actually is, on account of the refraction. The needle must, therefore, be carried well back and kept as close to the choroid as possible. As the fluid is removed the retina falls against the side of the needle, and puncture of the retina is not apt to occur while the needle is held in this position.

The aspiration should be continued until all the fluid has been removed, and it is of advantage to have an assistant with an electric ophthalmoscope observe the subsidence of the detachment while the aspiration is going on. This, through a widely dilated pupil, is no very difficult matter. If the aspiration is done subsequently, it is better to wait, if possible, until the swelling of the flap subsides somewhat. To find the trephine opening through a swollen flap is not always an easy matter, as capsular adhesions interfere, and through the swelling of the tissues the dark spot indicating the opening becomes invisible, so one must search for the opening by a series of cautious stabs. Once the opening is found, however, the needle can be easily introduced into the subretinal space, and the aspiration should follow the principles previously mentioned.

It cannot be too strongly insisted upon that the aspiration to be effective must remove practically all of the fluid. If any fluid is left behind, it will interfere with the reposition of the retina, even if it be present in but small quantities.

The reaction following the trephine operation is but slight, and that following the aspiration depends somewhat upon the amount of fluid withdrawn, being greater the greater the amount of fluid removed. It is relatively slight, however, in any case, and in only one case have we had any unfortunate result that might have been laid to the aspiration—the case of hemorrhage already quoted. However, there is certainly less likelihood of a choroidal hemorrhage from a needle puncture than from a direct incision. The patient is kept in bed merely until the operative reaction has subsided. Our feeling is that where the operation is successful, the recumbent position is not necessary for more than a few days, and where the fluid is not thoroughly removed, no amount of rest in bed seems to be effective in causing the absorption of the remainder.

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IV.

BUSINESS AND OFFICE METHODS IN SPECIAL PRACTICE.*

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It has been truly said that the practice of medicine is not a money making profession, and that when the cost of a medical education and the years spent in its acquirement are considered, it may be reckoned as a poor investment.

The average income of the physicians of the United States of America is said to be less than $1,000 per year. Of the total number, however, probably not more than twenty-five per cent are fitted to practice the healing art, so it is not surprising that the vast army of incompetents reduces the average income to its present small figure. It is to be hoped that the higher standards now in force will result in fewer doctors, greater skill and efficiency, and larger incomes.

In business and the law much of the routine work is delegated to assistants, but in medicine personal service is demanded, and until recently no attempt has been made by our profession to systematize practice or introduce business methods. This in a large measure is due to the fact that the average graduate in medicine has done nothing but attend school, and has no idea of business methods or office routine. When he begins practice he has so little to do that he can carry his books in his vest pocket. He begins wrong, his business methods do not improve as his practice increases, and in a few years his books are always behindhand, his correspondence piled a foot high on his desk, and his personal and business affairs in a state of chronic disorder. The resulting wear and tear on his nerves, temper and health are beyond computation. His excuse is that he is "so busy" that he has no time to attend to details, but most successful men in our profession, as well as in commercial life, are men whose affairs are well ordered. The successful doctor who is not orderly is to be pitied, as he never has a minute which he can call his own, while his wife and family are but distractions instead of comforts.

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To the physician whose practice is largely office work, much greater opportunity is given to systematize his affairs. This is particularly true of the oculist, and to a somewhat lesser degree of the throat, nose and ear specialist.

Except in the very largest cities, it has been until recently the rule that oculists, at least in the earlier years of their practice, have also treated diseases of the throat, nose and ear, and I have no doubt the majority of my hearers do more or less of this work.

It was my intention to prepare a more or less impersonal paper, but there are difficulties in doing so which I have been unable to surmount, so I must apologize for the personal element as it appears in what follows.

The methods set forth are the result of fifteen years in special practice. No originality is claimed for any of the ideas presented. When I have seen, heard or read of any scheme or device for promoting efficiency, I have endeavored to use it as well as the exigencies of my practice permitted. I do not think for a moment that my system is perfected, and am constantly inaugurating new methods. I trust what I may say will be of assistance to some of you, and in the discussion which follows I hope to get many valuable suggestions.

Having always a decided preference for ophthalmology, I three years ago took an associate, with the understanding that he should devote particular attention to throat, nose and ear practice, with the expectation of ultimately having it all. Naturally, many former patients prefer to have me treat them, and at the present time I do what throat, nose and ear practice I cannot avoid, and my associate does such eye practice as naturally comes to him. When one is absent the other cares for all the work.

The arrangement is a satisfactory one from all points of view. He is paid a percentage of the net income from the practice, and the amount is increased each year. The expenses of conducting the practice are but ten per cent greater than four years ago.

Living in a small suburban city, rents are moderate enough to permit of more space than is usually found in a doctor's office. The six offices occupy the outer tier on the second floor of an office building. The four inner rooms are sixteen feet square, and the front and rear ones are about twenty feet square. Each room has an exit to the hall. As the rooms are not arranged for doctors' offices there are a few inconveniences which cannot be surmounted. The toilet is across the hall, and to gain the rear offices patients must traverse the intervening rooms, but fortunately our practice is not of such a nature as to require the strictest privacy.

The front room is used for a waiting room, and has seats for fourteen people, but there is ample room for additional chairs when required. When possible, a front room with a pleasant outlook to the street should be given the preference for a waiting room.

The second room is the nurse's office, and contains two book cases, a large flat top desk, a typewriter desk, filing cabinet for cards, a sofa and several chairs.

The third room is the office of the throat, nose and ear specialist, and contains ample equipment for all work, being the office I formerly used when working alone. It contains roll top desk, ophthalmometer, trial case, Ransom and Randolph throat and nose cabinet, electric cabinet, glass table and instruments, electric sterilizer, bottle heater, fountain cuspidor, air tank, "Little Wonder" air pump, test cabinet, wash bowl and several chairs and stools.

The fourth room is the ophthalmologist's office, but is equipped so he can do throat, nose and ear work also, having a second Ransom and Randolph cabinet, and is lacking only in a fountain cuspidor, electric equipment and ophthalmometer, the duplication of the latter two being unnecessary. This room also contains a book case in which are assembled all works on ophthalmology.

The fifth room is an operating room with cement floor, white enameled walls, glass operating table, large hospital sterilizer, instrument cabinet, glass dressing tables, chairs, stools, bowls, etc.

The sixth room contains two beds, two large cupboards or presses for supplies, clothing and sundries, chiffonier for towels, gowns, etc., and the numerous odds and ends which would be unsightly in the consultation offices.

The two doors which are most frequently used as exits have large plate mirrors set in them, and departing women are sent to the nurse's office for the adjustment of wraps, hats and veils, thus saving much time. While so many and such large rooms are not an absolute necessity, they are of the greatest convenience. After efficiency the desideratum is speed, and with such offices several patients can be in at the same time, either being treated or prepared for treatment. Minor operations are often performed preceding, during or following regular office hours.

But few of us are fortunate enough to have such a select practice that half a dozen patients daily afford ample income. The successful man who charges moderate fees finally arrives at a point where it is almost impossible to see all comers every day, and when that time comes every minute or even second saved increases the number of patients he can treat. Many of the suggested methods may sound trivial, but they are all carried out with the view of saving time. To the man who urges all patients to come at 9 a. m., that he may have the appearance of being excessively busy, or to the one who puts his patient on an operating table wrapped in sterile sheets and makes the removal of a foreign body from the cornea a major operation in order to "justify the fee," my suggestions will be of little value. What I have to say is for the busy man who wishes to make haste without appearing to be hurried. In the endeavor to work rapidly two things must be avoided: failure to give the patient a full and careful examination, or, what is still worse from the patient's point of view, giving him the impression that his examination is being hurried. It is often an advantage not to know how many patients are in the waiting room.

Since the offices are in an office building there is no bell or door attendant; the waiting room door bearing the names, office hours, and in large letters below the word "Entrance." A door trip rings a bell in the third office each time the waiting room door is opened. This bell is loud enough to be heard throughout the inner offices. At the door of the nurse's office a push button leading to a small bell is hidden inside the door jamb. All patients who come by appointment during office hours are admitted here and are not seen by the patients in the waiting room.

The office hours are 8 to 12 a. m. daily, including Sunday, and every evening 7 to 8 o'clock, except Sunday. To make the evening work less confining, each man comes on alternate nights, and as most evening patients are by appointment, little confusion results and nearly all patients come on the proper nights. If a mistake occurs it is a very easy matter to give the patient sufficient examination or advice to satisfy him and ask him to return on the following evening. Poorly dressed, unkempt patients, or undesirables of various sorts, are sent back in the evening. Many business men and women prefer to return in the evening. When the office maid leaves at 4:30 p. m. the waiting room is left open so that any patient arriving before 7 p. m. can enter and wait. During July and August evening hours are kept by appointment only. The use of a cycloplegic on Saturday or Sunday often spares a patient loss of time from business.

The janitor service of the building is not employed except for washing floors and windows and emptying waste. An office maid is employed, who comes daily from 12 to 4:30 p. m., and she takes home with her all office laundry. She is intelligent enough to take messages or collect money, and in the absence or illness of the nurse comes and assists during office hours. The nurse is a graduate of our local hospital training school, and also does stenography and typewriting. She prepares and sterilizes all surgical dressings in the large hospital sterilizer. Practically all private adenoid and tonsil operations are done in the office operating room, being sent home in a cab in from two to five hours. If it seems advisable, they remain over night. The mechanic or clerk cannot afford to pay for a private room in a hospital, but is self-respecting enough to wish to pay something, and our usual charge for such is one week's wages. Enough to pay the entire cost of the operating room is received every year from these cheap adenoid operations.

As before stated, the desideratum is speed and efficiency, and my aim is to do nothing that someone else can do as well for me. All mail is opened by the nurse and in so far as possible dispatched by her. She credits money, acknowledges reprints, receipts bills, and often writes letters which are not dictated. Time and postage are saved by having detachable slips on statements, thus obviating the necessity of receipting bills. All such matters are slipped into her pigeon hole in my desk and are done by her after office hours are over. A bank book can generally be balanced in a few minutes if the checks are all sorted and a memorandum made showing checks "not in."

All records of patients or accounts are kept on cards, and while special eye, ear and account cards, such as are here shown, are of advantage, a single style of plain card can be used equally well. As each patient is brought in the nurse gives the name, stating the character of the case, and, if a former patient, the former record card is in the hand of the surgeon before the patient is admitted. The surgeon does not save much time by having someone else take the history, and he loses much of the personal touch which is often so important in arriving at a correct diagnosis. It is most unwise to cut off the patient during his tale of woe, to appear bored or make light of what seems of such grave importance to him. First impressions go a long way, and the first sixty seconds may determine whether the glasses you are to prescribe will give satisfaction. However, much garrulity can be forestalled if you meet the patient cordially, and immediately take the case in hand by a series of rapid and pointed inquiries.

Each consulting room is arranged to permit a superficial eye, ear, nose or throat examination being quickly made. All work is done by artificial light, electricity only being used. The windows are frosted with a thin layer of white paint, and heavy black curtains can be quickly drawn. I have devised a hood with a heavy wire frame covered with black felt to be held by the nurse over the heads of the surgeon and patient for transillumination of the sinuses. The upper halves of the windows have outside screens, so that the upper windows can be pushed down from the top in summer, yet people in the adjoining building cannot see what is going on.

For nose, throat and ear work the electric headlight is used. There are several varieties, but the Klaar has the combined advantages of the older electric patterns and of the head mirror. Should the street current fail, tungsten lamps and a small battery give equally good results. Dr. Lynch of New Orleans has had the thread on his Klaar light changed so that the lamps used in small pocket batteries can be used, thus saving considerable expense.

An oak American Optical Company cabinet with tilted lens rack is used, and on the top is placed a gooseneck electric light, permitting a wide variety of adjustments. The stool on which throat, nose and ear patients are seated is pulled about two feet toward the lens cabinet and the patient, seated facing the light, is then in the proper position for direct study and oblique illumination. Following this the stool is placed directly in front of the cabinet and examination made with the ophthalmoscope. If I say, "Please sit on the stool with your back to the light," four times out of five the patient will deliberately move the stool and face the light. While if I say, "Sit here, facing me," the patient practically always does as he is told. As the room is partially darkened, it is seldom necessary to draw the shades. Using a Morton ophthalmoscope, with plain and concave mirrors, the refractive condition, clearness of the media, and fundus conditions are perceived almost at a glance. In the corner, to the left of the cabinet of lenses, is a chair, and when the patient is seated thereon the examiner sits on the stool in front of the cabinet. The gooseneck light is swung behind the patient, or, if necessary, turned out.

A Hardy test box or cabinet is used for sight testing, and the roll on which the letters are printed has been altered to bring the round opening for muscle testing just below the English letters. This change saves time, for in ninety-eight per cent of cases the English letters and the target are all that have to be shown. The acuity of vision can be ascertained with great rapidity, the only inquiry necessary being, "Can you read those letters?" And if the answer is "Yes," "Please read them." A push button switch beside the examiner controls the light. A small mirror on the top of the lens cabinet permits him to see the line exposed.

The acuity of vision and retinoscopic findings decide whether the patient shall be put before the ophthalmometer. If this is done, time is saved by the nurse standing behind the patient and holding the head steadily against the forehead rest. Much time is often lost by timid children and restless adults moving the head, particularly pulling away from the instrument. Muscle balance can nearly always be determined satisfactorily and accurately by the Maddox rod and the cover test. If cycloplegia is found necessary, homatropin is usually employed and is instilled by the nurse.

In each consultation office a small Prometheus electric sterilizer is kept constantly going at low speed. When closed the water just boils: after using an instrument the surgeon raises the cover and drops it in the sterilizer. The cover is left up as a signal to the nurse, and when not otherwise employed she removes the instruments, dries them and places them in the Ransom and Randolph cabinets. A closed sterilizer is supposedly empty. A closed de Vilbiss bottle heater keeps two or three bottles at the proper temperature for ear irrigation, and much time is saved by having the solution ready for immediate use. Skillful manipulation of the cut off permits any degree of force desired in the irrigation. Bottles are refilled with lukewarm saline solution by the nurse between patients. Saline is made up double strength in large quantities, and the bottles being half filled with this solution, hot sterile water is added from the tanks of the hospital sterilizer. While the bottle is being filled the tip is inverted in the electric sterilizer.

It is desirable to have a definite routine plan of procedure in all work. After fitting the right eye, both the spheric and cylindric lenses finally chosen should have their handles turned in the opposite direction from the usual. Use lenses in left hand row for patient's right eye, and vice versa. After fitting the left eye, turn down handles also before proceeding to investigate muscle balance or giving presbyopic correction. Then if interrupted or called to the telephone, the correction selected by the patient will not be forgotten. Skiascopy is done working at half a meter, which is just at arm's length, and the Marple skiascopes are held in the left hand of the examiner, which permits rapid exchange of lenses. Careful and accurate skiascopy is done only in small children and illiterates. In intelligent patients only the approximate refraction is determined, as the trial case is the court of final resort. Working at half a meter, with the light above and behind the patient, + 1.50 S. must be deducted, instead of + 1.00 S., as is done in the usual method.

Every effort is made by all to conciliate and please every one with whom we come in contact. A "grouch" should always be left at home or dropped on the way to the office. Every business matter, telephone call, or detail on the record of a departing patient should be cleared away before admitting the next patient, as any preoccupation on the part of the surgeon is resented by the patient. An excellent motto is—"Do it now." Tact and judgment on the part of the nurse are of the greatest value. Tactless, officious or persistent inquiries on her part in the waiting room may exasperate a secretive patient and bring him into the consulting room in a frame of mind which will preclude satisfactory results or return visits.

Tact by a nurse is particularly necessary at the telephone. Many patients refuse to give their names and insist on speaking to the doctor, who is exasperated to be called to the telephone to be asked his office hours or discuss fees. When asked by telephone my office fee, my reply is, "As much as I think the patient can afford to pay." The question of fees is best adjusted at the time of the consultation, and I have a tentative fee bill on a scale of very poor, poor, moderate, well-to-do and wealthy. The excessive fees of city specialists are responsible for much of the abuse of medical charity, and our profession is as much to blame as the public. If it is distinctly understood that the fee is less than the regular charge, and that the concession is made on account of the patient's inability to pay full rates, the surgeon does not cheapen himself or cut rates. A notice stating that the usual office fee is from $3.00 to $5.00 is framed and hangs in a conspicuous place.

Feeble or infirm patients, women with crying babies, the man to pay a bill or make an inquiry, can generally be brought in out of turn if the nurse is a skillful general. The patient who is next or almost next and has grown impatient with long waiting feels he is making progress if brought into the nurse's office on some pretext. He will sit and visit with her for fifteen minutes without impatience, where, perhaps, he would refuse to wait five additional minutes in the waiting room. Needless to say, it is undesirable to have a clock in the waiting room.

Two or three patients are often being cocainized or prepared for dressing while both surgeons are occupied. Many eye cases need only be inspected, and the nurse instills the drops and applies the dressing.

Patients who ask for appointments during office hours are told to come to the door of the nurse's office and ring the bell. The push button is so hidden that it is noticed only by patients who are told to look for it. Patients who demand appointments are required and generally can afford to pay maximum fees.

Referred cases are so recorded, and a check mark in front of the doctor's name indicates that the case has been acknowledged. In all referred operative cases the family physician is asked to give the anesthetic or recommend the anesthetist. This is a courtesy to which he is entitled, and if he is not competent a hint is often dropped that the case presents certain difficulties, and an expert anesthetist would be desirable. It is desirable that he send a separate bill for his services, whether anesthetist or assistant at the operation. The readiness with which the family physician takes offense is often puerile, but it must be met and concessions made to him if his friendship is to be retained. It is wisest to prescribe no general treatment whatsoever, but work hand in hand with the family physician in the capacity of a consultor.

Printed directions are given patients for guidance before and after adenoid operations, and about twenty-five of the prescriptions most frequently written are made up in rubber stamps and stamped up in pads of fifty. They are designated by numbers like a hospital formulary, and record keeping is thereby greatly facilitated. They are kept in a guide card index and designated by their respective numbers.

Record cards are kept in the straps at the two sides of the desk. On the left are kept all cards of patients under treatment, and the cards are put on the right as soon as the case is finished, with the exception of former patients who are to return for the inspection of their glasses. These latter are kept among the cards of those yet under treatment, to avoid looking through the back files again when they return for the inspection of their glasses. The completed case cards are filed by the nurse from time to time. Cards for the current six months are kept in a guide card box on the nurse's desk. Consistency in fees is the aim; on the lower left hand corner of each card is placed in small figures the fee charged per visit. If fee is charged for subsequent visits, the amount of the subsequent visits is placed after the primary charge. If a refraction case, and a lump sum is charged, the Roman character is used above the price of single visits to designate a lump sum for the refraction. In this way the various members of the same family are charged a like amount. If a patient states that he or she was sent by a friend, the friend's card is found, and if their financial stations compare favorably the same fee is charged. Otherwise, various inconsistencies may arise. If on the first visit the patient offers to pay a part or all of the fee for examination it is accepted, and above the figures in the corner marked in pencil "Pd." This is entered on the book as cash. No charge items are entered for refraction cases until the case is finished, when, if not paid, the full amount is charged.

Statements are sent out each month—not to all patients, but to those on whose account cards are indicated in small pencil figures the dates, thus: 10/1, 12/1, 1/1/15, etc. After running the gamut of various collection agencies, I have come to hand delinquents over to a collector who collects for several of the largest business houses in the Oranges. His charge is ten per cent for all accounts above $5.00 and twenty per cent for amounts less than $5.00. I never sue and practically always compromise for what I can get—$5.00 and the patient's good will are better than a bill against him for a large amount. If coerced, he may become a persistent and energetic "knocker." Rarely a sarcastic letter enclosing a receipted bill and making the patient a present of the account, results in its being promptly paid.

Many doctors find their bookkeeping a serious problem, particularly since the enactment of the recent income tax law. The system we use is very simple, yet accurate and complete. Each surgeon keeps on his desk a small diary and therein enters all items, whether cash, credit, or charge, thus:

John Doe	ca.	$ 5.00
John Smith	cr.	10.00
Mary Doe	ch.	3.00
Mary Smith	ca.	10.00
Mr. Wm. Henry 40 State St. E. O.	ch.	5.00

The last charge signifies that Mr. Henry is a new patient, and the nurse opens an account with him. An account card ledger system is kept, and all charge and credit items are posted to the various account cards. A check mark placed before the name indicates that the item has been posted.

The sum of the charge and cash items each day is the amount earned, and the sum of the credit and cash items is the amount collected. By footing amounts earned at the bottom left hand corner and amounts collected at the bottom right hand corner daily and adding to preceding monthly totals, and carrying forward to the top of the next page, each page shows at the four corners as follows: Upper left corner, amount earned this month to date. Upper right corner, amount collected this month to date. Lower corners, like amounts for the day.

In estimating income tax, give total earned and total collected, designate difference as amount lost in poor debts and concessions to patients. My associate takes and keeps all money tendered to him, and at the end of each month settlement is made to him on the basis of amount collected as compared with the share to which he is entitled.

In conclusion, let me advise—be ever ready to reexamine for glasses the eyes of a dissatisfied patient. Findings are often markedly at variance within a month or even less. Make no promises. Be honest. Never worry. Do your best—angels can do no better.

V.

THE ARREST OF CATARACT AT AN EARLY STAGE.*

E. L. Jones, M. D.,

Cumberland, Md.

Since the earliest time of the scientific diagnosis of cataract it has been generally admitted that there was little to be done for those developing this disability except to leave the matter to nature's course—a continuous progress, sometimes fast, sometimes slow, to blindness. True it is that nature sometimes arrested this progress between its earliest and latest stages, often too near the last to be of much real service. This hoary doctrine was given a hard jolt by Lt.-Col. Henry Smith of Amritsur, India, in an address before the Oxford Ophthalmological Congress last July, as published in the *Ophthalmoscope* for September, 1914, and republished in the *Indian Medical Gazette* later, on the "Treatment of the Earlier Stages of Senile Cataract."

The vastness of his experience in operating for cataract challenges an attention commanded by no other living person, and it is most remarkable, as well as most fortunate, that one possessed of such surgical skill should have sought a medical cure to prevent the conditions on which his fame was based.

He describes an early stage of cataract before opacities show in the lens, manifested by an appearance of the fundus as though being seen by a poor light; this is followed by a fine dusty haze in the lens, and then visible opacities. In this early stage only the far sight is reduced, and not the reading vision, and his duties as examiner of government railroad employes have brought to his notice many cases of this kind, whereas the European and American civil life practitioner usually sees only the more intelligent cases when their reading vision begins to fail, and the less intelligent when their ability to perform their simple duties and tasks is ebbing away.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22nd and 23rd, 1915.

By administering to these early cases subconjunctivally a massive injection of cyanid of mercury, setting up the normal physiologic reaction desired, Col. Smith says these cases are cleared up to normal, and sometimes to supernormal, vision in a few weeks, and examinations two and three years later have shown the arrest to be permanent.

After reading this report I wrote to Col. Smith, saying that it was questionable if of all those seeing his paper there was anyone anywhere more rejoiced than myself; that in a modest way and a limited field I had been led to very similar conclusions; that due to these said limitations there was a reasonable possibility that my observations and deductions were erroneous, but that in view of his parallel conclusions, I felt sure I was standing on solid ground, and that I would take the liberty of sending him reprints of a paper on subconjunctival injections published in the *Journal of the American Medical Association*, September 21, 1912, and one, entitled "The Usefulness of Dionin in Early Senile Cataract," from the ANNALS OF OPHTHALMOLOGY, October, 1913.

In due course of time Col. Smith most graciously replied, as follows:

"AMRITSUR, PUNJAB, November 15, 1914.

"DEAR DR. JONES:

"Very many thanks for your letter and reprints. I am glad to find a man convinced on the same subjects as myself. Your cases are of great interest, and I see you and I are crystallizing down to exactly the same views as regards the early stages of cataract. The symptoms of early cataract I have detailed; I see you do not note them, but I am sure all our observations will gravitate to the same point—exact and true, which are the only things that can live. I saw your paper on subconjunctival injections at the Atlantic City meeting, and there again we are agreed.

"I never use less than twenty-five minims in children if it is 1 in 2,000; in adults, 1 in 4,000; and over 60, 1 in 6,000 cyanid, with the object of getting a standard reaction. The younger the patient the stronger the solution required. Everyone who comes to my clinic is taken with the rapid and marked effect in pannus, corneal ulcers, lymphatic pannus, and keratitic as well as in fundus conditions.

"I now give adults one-half grain morphin hypodermically an hour beforehand, and cocainize well at the time, to make it tolerable. . . . Ultimate victory is what we are fighting for, and it will be ours, and nowhere more certain than in early cataract. I always say that the most important man in creation to convince is one's self.

"Again thanking you, and congratulating you on your results,

"Yours very sincerely,

"HENRY SMITH."

Had not several years' observation convinced me that scant notice was given to my claims by those in high places, I should not feel justified in giving publicity to this letter, which was entirely personal, but the voice of Col. Smith should sound as a megaphone to ears to whom mine would be but the wail of an infant in swaddling clothes.

To bring the subject before this gathering for discussion, my contentions may be briefly synopsized as follows:

Cataract in the aged should not be considered a normal senile change, comparable, as is usually believed, to gray hairs, but a manifestation of some pathologic process in the uveal tract, ciliary body or choroid, whether this process is recognized by other symptoms or not. The first manifestation is a fine dust, and after distinct opacities have formed it is still by this fine dust formation that the opacities extend. When the lens becomes sufficiently sclerosed this dust formation ceases, and there is no further clouding of the lens substance. Treacher Collins is quoted as saying that the nucleus may become sclerosed and remain clear, while the softer cortex goes on to dense whiteness. I have here the clear nucleus from a patient ninety years old, whose cortex was entirely white, and so soft as to entirely wash away by agitation in water. By stimulating the lymphatic circulation of the globe by the systematic use of dionin drops or, as practiced by Col. Smith, the sufficiently strong subconjunctival injection of cyanid of mercury, an artificial sclerosis of the lens is accomplished, which causes the disappearance of the fine dust and arrest of cataract. My belief is that it cures some low grade perversion of the function of the ciliary body, which is credited with the nutrition of the lens. Where there is no perversion of the nutrition of the lens, neither dionin drops nor injections have shown any tendency to sclerose the lens. A few cases have been observed where the lens was penetrated by nails, thorns, etc., causing traumatic cataract, with bare ability to distinguish fingers, in which the prompt use of dionin in the first two or three days after the injury caused most of the opacity to clear up, except in the track of the penetrating wound, with restoration of reading vision; a strong convex lens, even in the young, being necessary to see close, which is taken as a further evidence that the lens has sclerosed. Its irregular refraction and density, and the sharpening of vision by the pin hole tests, are also taken as evidences of sclerosis.

The small number of these traumatic cases, and impossibility of following them up to ascertain permanency of results, prohibits claiming these observations as being more than tentative. No value is claimed for this treatment in spontaneous cataract which has passed the stage of ability to read coarse prints, nor are dense opacities supposed at any time to disappear, but absorption of the fine dust gives interspaces between the sclerosed tracts, comparable to the difference between a bush in summer with leaves, and in winter when the leaves are off.

The strength of solution which has been most generally used is eight grains of dionin to half an ounce of cyanid of mercury 1/1,000—three drops in the eye at bedtime every night. As many eyes get very red, and some chemosed from these drops, bedtime is preferred for use so that these effects may pass off during sleep.

No attempt will be made to prolong this paper by case reports, but the matter can be summed up in a general way by saying that a large percentage of cataracts still having ability to read the coarser prints will rapidly become able to read finer prints by the treatment as outlined, and continuance of treatment will usually cause the gain made to be permanent. The close reading is relatively better than the far vision, due to irregular refraction of the sclerosed lens, and in several young patients the power of accommodation is destroyed. The continued use of the dionin drops, or one or more subconjunctival injections of cyanid in quantity, to which dionin may be added, accomplish practically the same result by the increased lymphatic activities induced.

Last year's literature gave a synopsis emanating from Jena, on the medical treatment of fifty cases of early cataract with good results, in which a multitude of things were dropped into the eye, amongst them dionin. It is my belief that the dionin did the work, and the other drugs might as well be left out.

I have under observation cases ranging from eight years back down to the present, in which the arrest of the cataract still holds, and my faith in the merit of this treatment increases with each year's use.

VI.

MANAGEMENT OF THE EYELIDS DURING THE CATARACT OPERATION.*

(ILLUSTRATED.)

DERRICK T. VAIL, M. D., F. A. C. S.,

CINCINNATI.

To a great many operators the management of the eyelids during the cataract operation does not seem a matter of very great interest or importance. The operation can be done smoothly, granting we have the full cooperation of the patient, no matter what kind of speculum, lid retractor or blepharostat is used; in fact, in such cases the entire operation can be neatly and well done when all such instruments are discarded and nothing but the fingers used to control the eyelids. In such cases, however, the operator must trust his patient to be calm and obedient. The success of such an operation, therefore, lies very much with the patient. If he can control himself properly and respond to every request, the operation, in the hands of an expert, is so simple, speedy and successful that there is no operation in the domain of surgery that compares with it in beauty of execution and brilliancy of result.

If, however, the patient at any stage loses self-control and cannot or will not "look down" when requested, or suddenly squeezes his eyelids and is what we call a "bad actor," the operator is apt to become fussy, he loses his own coordination and self-control, and then there is no operation in the domain of surgery that compares with it in horror and disgust.

It behooves us, therefore, to study a method that will require little or no help from the patient.

Occasionally, too, we are required to extract a cataract from a patient who does not understand our language. I have operated on three hundred and fifty-eight such cases. (See *Knapp's Archives of Ophthalmology,* Vol. 41, No. 1.) In that series I was compelled to work without the cooperation of the patient, and I learned to rely upon myself entirely.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22nd and 23rd, 1915.

To properly control the lids and to operate without assistance from the patient is a very important matter.

The operation as done by Col. Smith, of India, furnishes us an illustration of how cataract may be extracted with absolutely no help from the patient. He requires nothing whatever from the patient but to lie there with his head on a small, hard pillow. No preliminary training is employed, no word of instruction is given. The eye is washed and cocainized, the Jullundur speculum is introduced, the conjunctival sac douched, the eyeball grasped with fixation forceps, the section made and the iridectomy performed. The upper lid is then suspended on a large hook and held by the assistant, while the lower lid is controlled by his left thumb. The lens is then pressed out, no matter where the patient directs his eye, be it up, down, in or out. No word is spoken to the patient. The iris is replaced, the eye closed and dressed and the patient carried to his bed on a canvas litter.

Smith's is the only cataract operation ever devised that eliminates the patient's equation entirely. The whole operation is completed in from one to three minutes.

I have said elsewhere, and I firmly believe it is true, that Smith's success is largely dependent on the help his superb Mohammedan assistant, Nur Ali, renders in controlling the eyelids.

The management of the eyelids during the cataract operation should embody two main ideas: (1) to control the strong group of muscles, which in sudden panic or defensive states tend to grip the eyeball and bring about disaster, and (2) at the same time to afford the operator a maximum field for operation. These objects can be accomplished in every cataract operation by whatever method, and that, too, without causing the slightest pain or distress to the patient.

Let us now inquire into what muscles are concerned in the forcible closing of the eyelids, so that we may fully comprehend what we must do in order to carry out these ideas.

The squeezing shut of the eye is a complex act. Strong muscles running in various directions act in unison to effect this phenomenon. The primary muscle is, of course, the orbicularis palpebrarum, but this muscle exerts but little pressure when acting alone. The synergetic muscles which assist in dangerous spasm during the operation are the corrugator supercilii for the upper lid, and the muscles of the cheek and side of the nose for the lower lid.

We can best study these by glancing at the familiar illustration, Figure 1, taken from Gray's Anatomy.

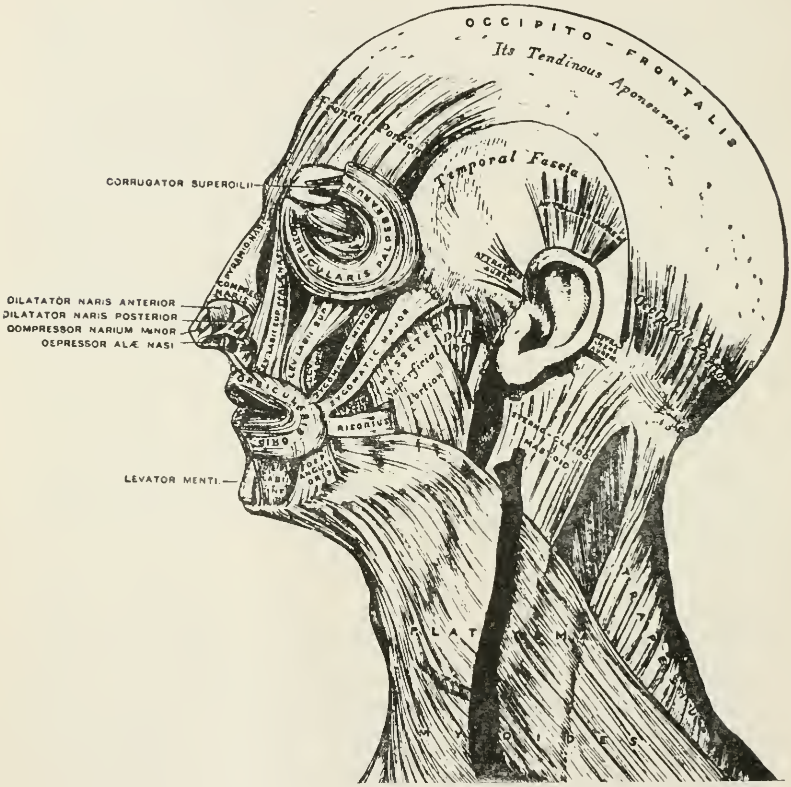

FIGURE 1.

The orbicularis palpebrarum is divided into two parts—viz., the palpebral and the orbicular.

The palpebral portion, the fibers of which are thin, pale and weak, arises from the tendo oculi overlying the tear sac and spreads in concentric curves under the integument of the upper lid to be inserted in the external canthal ligament. It is the involuntary muscle of winking, and is not a true sphincter, being semielliptical. In contraction it merely gently closes the eye. It contracts alone and while the orbicular portion is relaxed

The orbicular portion, the fibers of which are thick, red and strong, is a true sphincter muscle in that it completely surrounds the base of the orbit. It has a broad, strong attachment at its origin on the bone at the nasal wall of the orbit and the tendo oculi. Its fibers spread in bold arches and curves under the integument of the upper eyelid and the base of the orbit, to be attached at various places in the skin of the temple and cheek. Its upper fibers blend with the occipitofrontalis under the eyebrow, and also with the powerful corrugator supercilii. In completing the circle of the eyelids the lower fibers cover the lower eyelid, base of the orbit and lacrimal sac, and in this course they blend with the fibers of the levator labii superioris alæque nasi, the levator labii superioris, the levator anguli oris, the zygomaticus major and the pyramidalis nasi. This muscular ensemble is under voluntary control, and in contraction produces a powerful sphincteric action. When this group of muscles is in spasm there is produced a striking effect on facial expression, noted, for example, when soapsuds enter the conjunctival sac, or the subject makes strong defensive efforts to protect his eyes in cases of sudden pain in them, as we see in phlyctenular conjunctivitis, abrasion of the cornea, and occasionally, to our surprise, chagrin and disgust, during the cataract operation.

It is commonly taught that the upper lid moves but the lower lid is stationary. This is true enough in passive states, but in the presence of an irritant, dazzling, or during the slight pain of a cataract operation, the lower lid will glide upward against the eyeball with the strong action of the lower half of the orbicular muscle of the eyelids, aided by contraction of the group of muscles named.

It is this complex spasmodic contraction of all these muscles, pinching the eyelids together and squeezing the opened eyeball, which does the mischief during the cataract operation, and it is this oftentimes unexpected and always alarming act that we would frustrate.

Figure 2 is from a photograph which was taken to illustrate this act in a case where a stop screw speculum was inserted. You will note that the flanges of the speculum are lying against the eyeball and inviting mischief, because the speculum is locked by the screw and the sphincter muscles have an unyielding pair of spread levers to grip and struggle with. This speculum does not control the fornix tissue in the least, for the reflected portion does not reach more than half way up the tarsus. The tarsus is buckled by the strong orbicularis muscle contracting against this resistance, so that the equatorial region of the globe is being squeezed by a circular band of contracting muscle. One cannot use this speculum effectively in lifting the lids off the eyeball, for it will slip out.

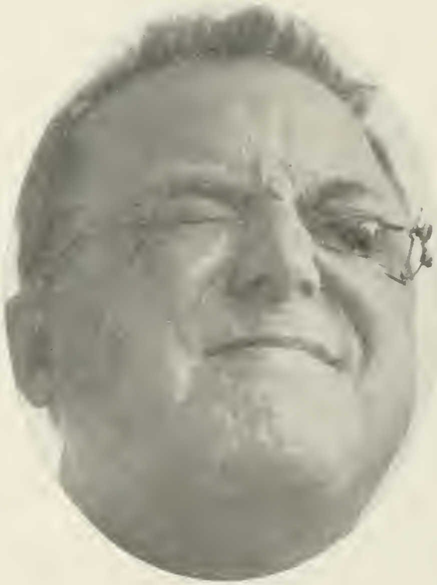

FIGURE 2.

Figure 3 shows the same act on the part of the patient while a Jullundur speculum is in the eye. Here we have some considerable recourse in combating the spasm, for, as you see, this speculum will permit the operator to grasp its distal end and will stay in place while the lids are being forcibly lifted off the eyeball. But even here the muscles are not completely disarmed, for, as you note, there is some squeezing force being exerted on the eyeball beyond the reach of the deeply reflected arms or flanges of the speculum.

I use the Jullundur speculum during the incision and iridectomy steps of the operation, and have often had occasion to grasp the hinge end of the speculum, as shown, and lift the eyelids away from the eyeball and at the same time overcome the contraction of the corrugator supercilii by means of the thumb of the left hand, as shown. Note that by this method of grasping the speculum no lock screw is needed, for the middle finger and thumb act to stiffen and widen the speculum better than any screw could do, and at the same time, if it should be wise to remove the speculum, full control is ready to slip it out.

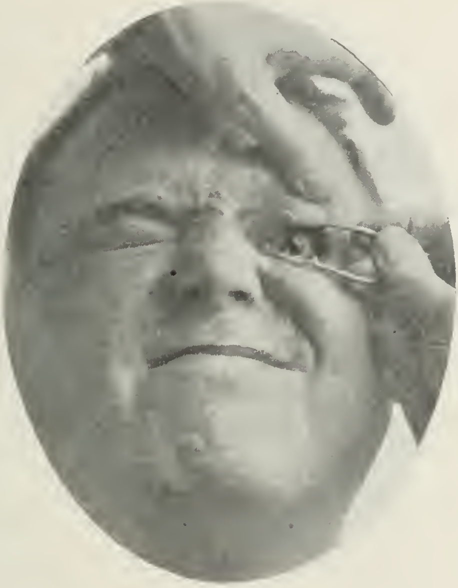

FIGURE 3.

Figure 4 illustrates the same method of retracting the brow and raising the eyelids off the ball with the Jullundur speculum to expose the cul-de-sac in preliminary douching of the conjunctival sac with the 1/5,000 bichlorid solution. The eye shown in the illustration is now ready for the douche stream to effectually flush out all shreds of mucus, exfoliated epithelial cells, loose germs and stale secretions, thus furnishing a clean eye for the operation.

I have explained this in detail elsewhere (see Smith's Cataract Operation, *Lancet-Clinic,* January 7-14, 1910). It is Col. Smith's method.

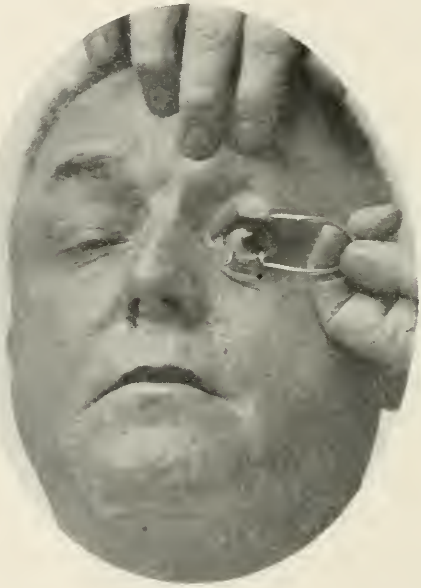

FIGURE 4.

Figure 5 shows my new lid retractors in the act of exposing the eyeball preparatory for making the section. Note that the upper eyelid is made to ascend above the equator of the globe, quite out of the way of the knife. This is effected by laying the handle of the retractor quite flat on the skin of the eyebrow, while gentle retraction is accomplished in the manner shown. The lower retractor acts in a similar way, allowing plenty of room for grasping the conjunctiva below the cornea with the fixation forceps and at the same time commanding the sphincter muscle. Should the patient squeeze during the section, the assistant can lift the eyelids and muscle tissue quite away from the eyeball by shifting the lines of retraction. To do this it is necessary only to swing the handles in a more parallel position vertically to the globe and thus hang the eyelids on these hooks.

I am not using these retractors for the section for, as above stated, I use the speculum, but I am showing in this illustration that they can be so used.

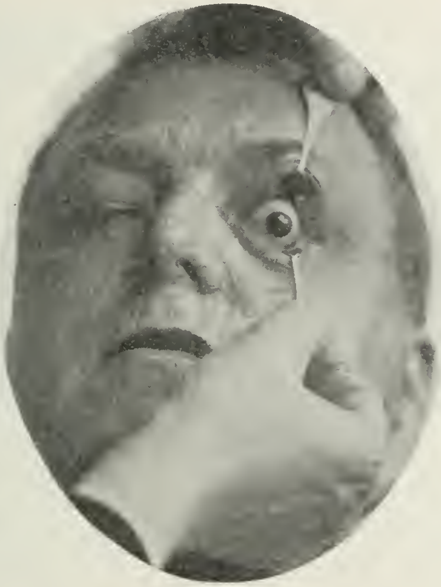

FIGURE 5.

Figure 6 illustrates the correct manner of holding the lid hooks during the act of delivery of the lens. Note that the upper hook assumes a semivertical position, which permits the assistant to lift the eyebrow on the tips of his middle and ring fingers, while the flat handle of the retractor is grasped with the thumb and index finger. This technic affords complete control.

The assistant should hold his elbow high to allow the operator room to approach the eye with the spoon in his left hand.

Should vitreous threaten to escape, the assistant shifts his traction to a more vertical direction, thus taking all the weight of tissues off the eyeball and at the same time allowing the operator full view of the entire summit of the eyeball. This permits the operator to be master of the situation at all times. There is no provision by any speculum which will allow this technic to be carried out.

The lower retractor is shown in place and assists in exposure of the eyeball and control of the sphincter.

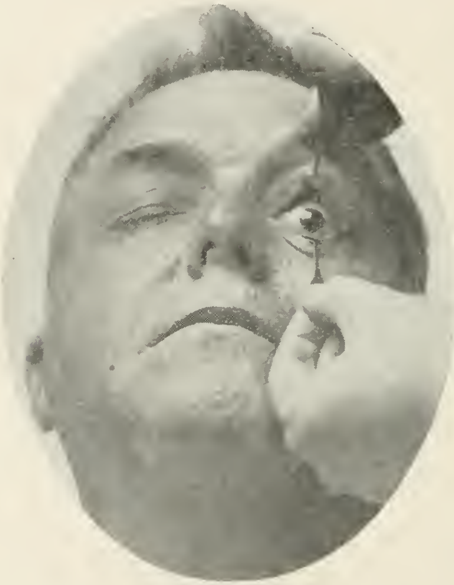

FIGURE 6.

Figure 7 again illustrates the upper lid hung on the retractor in the proper manner, and gives the operator's view of the field above the cornea. The operator does not stand behind the head of the patient, as is the usual custom, but to his right side, for either eye, so that he may see the lens make its exit and also see what is necessary to complete the operation.

In this figure the lower lid retractor was not used, but the lower lid is being held everted by the thumb of the assistant's left hand. The same thumb also prevents the cheek muscles from contracting. The open hand is spread over the chin and jaw to steady the patient's head and move the face in any direction to facilitate the operation.

This is the method I usually employ.

Figure 8 illustrates these new lid retractors. They were first described in an article which appeared in the *Ophthalmic Record*, May, 1915.

The larger is for controlling the upper lid; the smaller for the lower lid. They are alike in construction. There is a single bar on which the tarsus hangs; this gives the best efficiency in furnishing full exposure of the eyeball where exposure is needed. The cross bar on the end is curved on the flat to suit the contour of the eyeball, thus making it easy to insert. The purpose of the wide end is to afford a maximum hold on the loose tissue of the fornices, thus commanding the flaccid tissues in this region and holding them well away from the eyeball. These hooks cannot be pulled out,

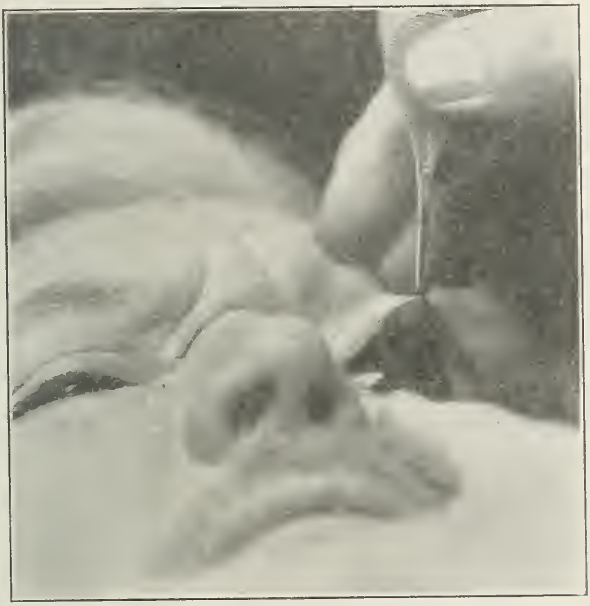

FIGURE 7.

for they are so built that they will stay, no matter at what angle the traction is made. They are constructed of hardened steel. The heart-shaped plate near the bend is designed to cover the cilia and prevent them coming in contact with the instruments used. They are made by V. Mueller and Co., 1775 Ogden Ave., Chicago.

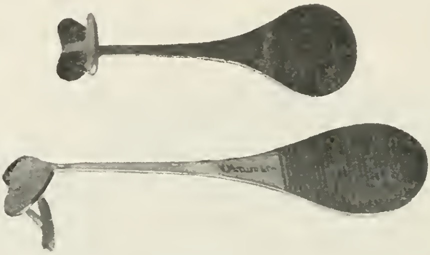

FIGURE 8.

The handles are short, broad, flat and corrugated, so that they may be easily and naturally grasped by a novice and will not annoy the operator.

The main purpose of these retractors is to enable the operator to use any assistant and not have to depend on one so skilled as Col. Smith's.

VII.

SOME IMPRESSIONS OF THE EXPRESSION OF CATARACT WITH A SLIDING CONJUNCTIVAL FLAP.*

H. Gifford, M. D.,

Omaha.

With the exception of some of the Indian surgeons, who regard a conjunctival flap as an unnecessary nuisance, the great majority of ophthalmic surgeons favor some kind of conjunctival covering for their cataract wounds. This tendency shows itself with most operators in the attempt to make a good sized conjunctival flap with the cataract knife at the time the incision is made. Others dissect up a large flap similar to that used in Elliot's trephining, and replace it with a stitch after the cataract is expressed. In pursuit of the same goal, the old idea of Desmarres, to carry the cataract incision far up under the conjunctiva without dividing the upper end of the bridge thus formed, has been taken up anew by Pansier, Vacher and Cluckie, while an offshoot of this procedure is seen in the conjunctival pocket operations of Czermak and Dimmer.

Kuhnt in his classic "On the Use of the Conjunctiva in Practical and Surgical Ophthalmology" (Wiesbaden, 1898, page 118), was the first to recommend and report the use of a sliding flap of conjunctiva for exceptional cases of cataract; while Ellett[1] was the next, and in this country the first, so far as I know, to report a cataract operation in which the conjunctiva was slid over the cornea. He dissected up the conjunctiva all around the cornea and united it in the center with a line of sutures. He did this on account of incurable conjunctivitis; and while he has not attempted to make it a routine measure, he informs me that he has since used it twice in similar conditions, with complete success.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22nd and 23rd, 1915.

In 1901-02 I did five expressions of dislocated cataracts, guarding against vitreous prolapse by first dissecting up the upper half of the conjunctiva and putting in what I have called a half purse string suture,* the latter being tightened as soon as the lens was expressed. The success of these operations inspired me with the idea of doing all my cataract extractions with a similar safeguard. The conclusion seemed inevitable that if such a sliding flap were a safeguard, both against vitreous prolapse and against wound infection, it ought to be employed as a routine measure in all cataract operations, even if it did make the operation longer and more difficult. Seeing no escape from this conclusion, I proceeded to do my next five cataract operations with a sliding conjunctival flap, drawing the latter down with a single stitch at the outer side of the wound. The result was most disappointing. The plan worked beautifully in three of the cases, but two of the eyes became infected; one badly, the other only slightly. I now believe that these infections, which seemed to start from the stitch, came from placing the latter too near the outer angle of the cataract incision; but be this as it may, the effect was so cooling to my ardor that in reporting the cases in 1904,[2] I had to admit that the sliding flap operation was not to be recommended as the normal method, and since then until the fall of 1914 I used it very exceptionally. After my own abortive effort, the first attempt to erect the sliding flap method into a routine measure was made by van Lint,[3] whose example has been followed by several operators, notably by Fox in this country, and by Constantinescu and Stanculeanu in Roumania. The reports of these men have been uniformly favorable. Puscariu,[4] in describing a slight modification of her own, mentions that in several hundred cataract operations done by Stanculeanu, since he adopted the method, there has not been a single "infection nor panophthalmitis."

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*The half purse string suture which I recommended in Posey and Wright's book, for covering large corneal wounds, is made by dissecting loose the conjunctiva around two-thirds of the corneal periphery and inserting a suture near the center of the undivided part of the conjunctiva, carrying it clear around in the margin of the loosened conjunctiva and out near the point of entering. When the thread is tightened it draws the flap over more than half the cornea; the advantage over the whole purse string suture being that enough cornea is left exposed to permit a fair judgment as to how any infection is getting on and to allow the ready absorption of atropin.

In the fall of 1914 I again began doing the operation frequently; not because I thought it ought to be done as a regular thing, but because I was forced to the conclusion that if one is ever going to use it for exceptionally desperate cases, one ought to do it often enough to be thoroughly familiar with the technic. The results of this second series of sliding flap expressions, done with a slight modification of my former technic, have been so favorable that I now feel strongly tempted to keep doing the operation as a regular thing. The series comprises sixty-eight expressions of senile cataract.* In all except one the result was good. The only patient with a poor result had a highly myopic eye with degenerated vitreous and central chorioretinal disease, and was operated on merely as a forlorn hope. The operative result in this case was perfect, but the sight obtained was only fingers at two feet. Two eyes showed a rather long postoperative congestion, but there was no marked iritis; and in all the other cases except one the postoperative irritation was exceptionally slight. One eye, which seemed to have an anticocain idiosyncrasy, had marked conjunctival chemosis for a few days. The visual results of the series were about as usual. Several of the patients had immature cataracts and have not yet returned for the final test, after going home with considerable cortex still in the pupillary space. Of the others, the great majority had 20/20 to 20/50, while a few had 20/70 to 20/100 as the result of vitreous, capsular or retinal complications.

TECHNIC.

In most of the cases which I did in 1902, I drew the conjunctival flap down with a single stitch fastened just below the horizontal meridian. I had long used this single stitch method for covering wounds of the limbus; and for moderate sized wounds it works perfectly, being simpler than the two-stitch method of the Kuhnt and equally efficacious; but for covering cataract wounds it is not so good as the van Lint method, as it produces tension in a line parallel to the cut. In the present series, therefore, I have, in all but two cases, used a slight modification of the Kuhnt method, which is practically the same as that used by van Lint and his followers. The conjunctiva is dissected loose around the upper half of the periphery, and back from the latter for one-half inch. A suture is then put in at each side of the cornea. In introducing these the needle is first passed through the conjunctiva at about the junction of the middle one-third with the upper one-third, taking a bite rather more than one-sixteenth inch wide; then it is passed through a substantial fold of conjunctiva at the level of the lower border of the cornea and loosely tied, a double turn of the thread being made. Then with the threads drawn well to the side the expression can be completed according to the likings of the operator. I make a large incision in the limbus and open the capsule with a bent sharp hook, pulling out the iris as the hook is withdrawn. The iris is cut out at right angles to the wound, the angles replaced and the chamber washed out by a stream of freshly sterilized warm boracic solution, after expressing the lens by pressure with large strabismus hook. Then, after loosening freshly formed adhesions of the conjunctival flap to the globe, the stitches are tightened and extra knots made, the center of the flap being thereby brought down one-eighth inch beyond the margin of the cornea.

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*Since this was read additional expressions have been performed, bringing the whole number up to one hundred and thirty. In all of these cases, also, the result has been good, except that one diabetic patient with a perfect operative result and no reaction had vision equal to fingers at six feet only, on account of old hemorrhages in the vitreous. Three of these eyes had prolonged but not severe iritis.

SPECIAL POINTS IN TECHNIC.

In dissecting up the conjunctival flap it is best to cut the conjunctiva as far forward on the cornea as possible, so that the conjunctiva, when it slides back after the stitches are removed, will remain attached far enough forward to cover any slight iris prolapse that may occur. The second bite of the needle in the conjunctiva should be taken, if anything, a little below the margin of the cornea and a little outside the lateral margin. This is the only point in which my technic differs materially from that of the other men who have tried the sliding flap method. I put the stitches far down and out in this way in order to bring the stitch holes as far away from the angles of the deeper wound as possible. Stitch holes in the conjunctiva, luckily, are not so prone to suppurate as in the skin, but it certainly lessens the chances of infection if they are kept well away from the deep wound. I think that the infection which I had in my first series, which I did ten years ago, was due to a lack of this precaution, as there seemed to be a distinct connection between the point of infection and the neighborhood of the stitch. With the second stitch bite so low down, it is not necessary to pull the knot perfectly tight in most cases, but it is well to have some leeway, so that if the conjunctiva should pull up extra easily from below, the flap will nevertheless be pulled down far enough over the cornea.

To keep the sutures (Letter A, black silk is used) from touching the skin, a rather thick pad of moist gauze about four inches square is laid on the forehead so that it projects well out above the eye. The tail of the thread is laid on this, and as it pays out over the edge of the pad it goes directly to the stitch hole in the conjunctiva.

Much depends on making these stitch holes at the right point. If made too far up, the flap binds and presses too tightly on the cornea; while if they are too low, it is hard to bring the flap down far enough in the center, no matter how far it is pulled down at the side. I find the junction of the upper and middle thirds of the cornea, or a very little below this, to be the most suitable point.

ANESTHESIA.

To do this operation easily, good anesthesia is essential, and to obtain this I apply ten per cent cocain four or five times to the conjunctiva which is to be cut or stitched, the first application being made about twenty minutes before the operation is begun. I also inject a single drop of ten per cent cocain under the conjunctiva one-eighth inch from the lower margin of the cornea at each side, four minutes before the operation is commenced. Two or three drops of adrenalin solution are also added.

ACCIDENTS.

Aside from the slight loss of vitreous referred to above, the only thing in the nature of an accident that occurred in the operations was an infiltration of the flap with blood. This occurred in one case only, but it was a very unpleasant complication, the flap becoming so thick that it was only after it had been stroked very firmly with a strabismus hook that it could be brought down to cover the wound—and at that the pattern was very scant. Puscariu speaks of having seen this several times in Stanculeanu's clinic, and advises that where it occurs the stitches be omitted—i. e., that no attempt be made to cover the wound.

This series is, of course, altogether too small to have much value from a statistic point of view, but it is large enough to have given me some decided impressions of the advantages and disadvantages of the operation.

DISADVANTAGES.

The main disadvantage is the extra time required. It takes more than twice as long as an expression without stitches. This alone would prevent it from being popular in a clinic where many cataract operations are done every day. But for the great majority of operators this drawback is negligible. There must be very few operators in this country who could not well afford to pinch out five or six extra minutes for every cataract that they operate, if they can thereby give the patient any better chance.

One's first impression of the operation is that it is more difficult; but really the extra steps involved are not more difficult, nor so much so, than the steps that are essential to every form of cataract operation. The operation simply requires a little more work, which is fully offset by the extra ease with which it permits other parts of the operation to be done. There are no other disadvantages that I have discovered, except that the stitches have to be taken out; this involving an outlay of another two or three minutes.

ADVANTAGES.

Several steps in the operation are made decidedly more easily after the conjunctiva has been dissected up and pushed back than where a good sized conjunctival flap is made with the knife. The cataract incision itself can be more easily done, because, with the limbus cleared, it is easier to locate the puncture and counter puncture properly, and less care is necessary in completing the incision. In making the iridectomy the scissors can be pressed down on the cornea in a way that is impossible where a conjunctival flap has been cut with the knife and turned down. The bleeding into the chamber which is so common when a conjunctival flap is cut with the knife does not occur so frequently. This facilitates the capsulotomy. The replacement of the iris is also easier.

With regard to the effect of the sliding flap operation on prolapse of the iris, while theoretically one might think it would be a decided safeguard against this accident, I must say I think it has very little influence in this direction. Although an iridectomy has invariably been the rule in my cataract expressions for many years, I yielded to the temptation to leave the iris uncut in one of the cases in this series, with the result that quite a large iris prolapse occurred. There have also been three or four other cases in this series in which slight prolapses have occurred, which, however, remained well covered by conjunctiva. In two of these cases a symmetrically placed double prolapse occurred; and as I have never had such cases in my previous experience, I believe this form of prolapse may be the result of too tense a flap, which is an additional argument for making the dissection very free.

The sliding flap is undoubtedly a safeguard against infection, but whether it is more certain in its action than a large flap well cut with the knife I am by no means certain. That it is not an absolute preventive is certain, as was shown by a case in which an old blind eye had a large irregular remnant of the lens in the chamber. I removed it by the sliding flap method, and the operation was followed by a great deal of pain and chemosis. There were no signs of infiltration of the cornea nor of exudate in the chamber, but the eye developed glaucoma and was eviscerated, and the sections showed the wound quite markedly infiltrated with leucocytes. The main advantage which the sliding flap has over the knife cut flap as a preventive of infection, lies in the fact that you practically always can get it in place over the wound; while when one attempts to cut the flap with the knife, one occasionally fails to get just what is wanted.

VITREOUS PROLAPSE.

The great and sovereign advantage of the sliding flap is, to my mind, the control which it gives over loss of vitreous. Wound infection can be guarded against so well by various measures that it is no longer much of a bugbear; but loss of vitreous still is the same old skeleton at the feast. When the vitreous prolapses after a conjunctival flap has been cut with the knife, the flap is simply a nuisance and would better be cut off; but with the sliding flap ready, vitreous prolapse need cause but little excitement. When the stitches are tightened there is no further loss, and the danger of infection is practically nil. This feeling of security against any considerable loss of vitreous is the great thing in its favor. Personally, I believe that I have had rather less than my share of losses of vitreous, probably because I have always been rather lenient toward cortex remaining in the chamber; but since I have become reasonably handy with the sliding flap I approach my cataracts with a distinct and comforting increase of assurance. In fact, instead of dreading vitreous prolapse, I positively welcomed the appearance of the bead in the first case where it occurred, just to show how nicely the sliding flap could control it. This control is especially advantageous in expressing immature cataracts. For these it is desirable to go to the limit of safety in the extent of the incision: the larger the cut the less cortex will be stripped off; but the larger the cut the greater the danger of vitreous prolapse. Hence the special advantage in such cases of the sliding flap.

For dislocated lenses, of course, there is nothing like it. This naturally raises the question, could it not be used with the intracapsular operation of Smith, and thus do away with the danger which keeps most of us from wanting to experiment with that method? With the incision so far down in the cornea as Smith and most of his pupils make it, the only form of sliding flap which would be of use is the purse string, or half purse string form. How much of the success of the Smith operation depends on its corneal cut I do not know, but if this is not essential (and the series reported by Arnold Knapp would indicate that it is not), it may well be that the intracapsular operation with a sliding flap will gain a popularity which would be impossible without the flap.

In this series of sixty-eight cases I have had three cases of vitreous prolapse; two of them very slight and controlled without difficulty by tightening the sutures; and the third, a quite extensive one, in which the wound gaped so widely that some difficulty was experienced in getting the conjunctiva to cover it. This, however, was accomplished by pulling down the margin of the flap with forceps while the sutures were being tightened, and the wound was left perfectly protected. It goes without saying that if prolapses of vitreous occur, an assistant should raise the branches of the speculum so as to prevent any pressure on the globe while the stitches are being tightened. It is probable that with a large prolapse of vitreous it would be best to cut the conjunctival flap loose about one-quarter of an inch above the cornea, as suggested by Kuhnt, since this would allow the flap to be slid over the wound with almost no tension on the sutures. This upper incision is made by Kuhnt as a regular thing, since he feels that without it such tension would be produced by the lower margin of the flap as to favor gaping of the wound, and there is undoubtedly some justice in this criticism; but if when the sutures are being tightened the flap is lifted well away from the globe by pulling on the uper end of the thread, it comes down so easily that the tension is negligible. It is of decided importance, however, to observe this point, since before adopting it I am quite sure that in one case a slight prolapse of vitreous was favored (in an eye in which the lens had been extracted in its capsule) by the tightening of the first suture.

To sum up, it is my conviction that while it may not be worth while to use the sliding flap as a routine measure, it certainly should be used in cases of dislocated lenses, or where, on account of hypermaturity, myopia, nervous temperament or anything else, there is extra risk of vitreous prolapse. Granting this, it follows that every operator should familiarize himself with the technic so that he will be ready and willing to use it in the cases where it ought to be employed. Over and above this, my own experience strongly inclines me to use it as the operation of choice.

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VIII.

THE USE OF LEAD STYLES IN THE TREATMENT OF DISEASES OF THE NASAL DUCT.*

H. Moulton, M. D., F. A. C. S.,

Fort Smith.

Lead styles have been in use many years. Dr. John Green advocated them as long ago as 1867. Their use, in my opinion, has not been as general as it deserves. At the Chicago meeting of the American Medical Association in 1908 I presented this subject, calling attention—

First—To the indication for the use of styles.

Second—To the superiority of lead (fuse wire of electricians) as a material from which to construct them.

Third—To the good results obtained from their use.

Since then experience only strengthens my good opinion. Many of my colleagues have reported that they have found them useful. But among those who have communicated with me, a few have reported certain troubles and accidents attending the method which are worthy of notice. It is to deal with them that I present this paper. They should not be held against the procedure.

All can be avoided by carefully following the technic laid down in my original paper, and none have ever happened to me. But taking them specifically, it has been claimed—

First—The style does not drain. Cause: (a) The style is too short. Remedy: A new and longer one must be made and inserted. Cause: (b) A false passage has been made. Remedy: If a probe cannot be passed into the nose the sac should be extirpated.

Always one must determine whether the end of the style is actually in the nose, by looking or feeling for it with a probe up and under the outer side of the inferior turbinate.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22 and 23, 1915.

Second—The style is uncomfortable. Cause: (a) It is too long. The lower end, resting on the floor of the nose, pushes the upper end too high into the canthus. Remedy: Cut off a little of the lower end. There should be some play up and down. The finger when pressed into the canthus should not feel rigid resistance from the style. Cause: (b) The curve of the main shaft is not correct, throwing the bent upper end backward against the eyeball or against the tissue of the eyelid between the style where it lies in the canaliculus and the eyeball. The end of this short extremity should be freely movable forward and backward. Remedy: The correct position can be obtained by properly bending the main vertical shaft of the style. Generally the plane of the radius of the concave curve of the shaft should be in the direction of the short upper end, rather than directed forwards, as at first might seem more natural. Cause: (c) The short upper horizontal end protrudes upward too much and irritates the upper lid. Remedy: Bend it downward in a more acute angle. It should lie loosely, entirely concealed in the canaliculus, except when the margins of the slit in the canaliculus are pulled apart. If too long it should be shortened, but not to such an extent that its end cannot be seen when the slit canaliculus is made to gape.

Third—The style descends into the nose, or slips out of reach. Cause: (a) The upper horizontal end is too short or is not bent downward at a sufficiently acute angle. Remedy: Obvious. Cause: (b) The perpendicular part may be too short. If long enough to come well through the duct, it cannot descend very far. The remedy is obvious: make a longer style—not quite long enough to reach the floor of the nose.

Fourth—The style doubles up. This curious and inexcusable accident has been mentioned only once. Cause: It was undoubtedly due to insufficient dilatation of the duct before attempting introduction, or to too much force. Remedy: The duct should always be sufficiently dilated so that the style will find its way through without force almost by its own weight.

Fifth—Relapses may occur. Cause: Style left for too short a time. It should remain for at least a month, and may be worn without harm for a year or more, best with monthly renewals. Remedy: A new style.

Sixth—Presence of the style may cause irritation, especially if incrustations form on its sides. If properly introduced and changed once a month this does not occur. It has not been reported to me, only expressed as a fear. Patients like to wear these styles. Those who have been victims of relapsing acute dacryocystitis beg to keep them permanently. But this is not necessary. Most cases can be permanently cured. Remedy: Change style once a month.

A few words in closing:

The fuse wire of electricians is the best material. It contains enough antimony to make it a little stiffer than pure lead.

A small fine flat file is all that is needed to round and smooth the ends, with a piece of hard wood or the thumb nail to smooth any rough place.

A pair of dressing forceps or iris forceps without teeth, or the fingers alone, are sufficient for introduction and extraction.

This method is not designed to replace all others in dealing with the sac. Syringing and probing have a permanent place. Extirpation is by far the best procedure in certain cases, and every ophthalmic surgeon should find occasions to do it. The intranasal operations are not yet sufficiently well established, but may be in the future. There are many cases which come from a distance or for other reasons cannot be seen often enough to be benefited by simple probing and syringing. Also, many who ought to have an extirpation or other operation refuse. These are the cases in which the style is of great value.

Canulas should never be employed. They clog up and become foul with secretions. The style is always clean.

IX.

OCULAR TUBERCULOSIS OF NASAL ORIGIN.*

W. H. LUEDDE, M. D., F. A. C. S.,

ST. LOUIS.

Formerly the diagnosis of ocular tuberculosis was not made unless the general condition of the patient strongly suggested tuberculosis. However, we have learned that apparent good health does not make the existence of ocular tuberculosis impossible. Individual experiences in this respect are confirmed by Bach,[1] who collected some four hundred cases of ocular tuberculosis in a study of the etiology of uveal inflammation. He states that in about one-half of them neither the history nor the general objective examination gave any clue to the origin of the ocular lesions.

Koch's tuberculin made possible the diagnosis of ocular tuberculosis where the disease was hardly suspected. Experience has demonstrated that focal reactions after test injections of tuberculin are more reliable than the mere clinical appearance of lesions.

We have noted for years the frequency with which ocular tuberculosis follows socalled "colds." Fleischer[2] referred to this fact, and believed that the bronchial glands were the source of the ocular infection, in the absence of all clinical evidence of active tubercular inflammation in the lungs.

The relation of an acute coryza to ocular tuberculosis will not seem so strange to us if we recall the frequency with which the general practitioner encounters pulmonary tuberculosis which dates its beginning to a "severe cold." But why should we seek in the chest for the origin of ocular tuberculosis? Truly, the lungs are the particular organ in the body most frequently considered in connection with the ravages of the tubercle bacillus, but anatomically the direct conveyance of the infection to the eye from a tubercular process within the chest is very unlikely.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22 and 23, 1915.

Certainly ocular tubercles are likely to be present in connection with general miliary or meningeal tuberculosis. In the former the bacilli are scattered throughout the body, and their presence in the eye is to be expected. In the latter the close anatomic relations between the meninges and the ocular tissues render the appearance of tubercles in the eye very probable. Fortunately, both these types are relatively rare. They do not explain the more frequent forms of ocular tuberculosis concerning which we are consulted, and which often yield to proper treatment in an eminently satisfactory manner with restoration of vision and freedom from inflammatory symptoms. In both miliary and meningeal forms of tuberculosis it is unfortunately true that patients rarely require ocular treatment. They succumb quickly to the general disease.

How then shall we explain the origin of ocular tuberculosis in the majority of our patients, approximately one-half of whom show no constitutional disease?

In a report on the relation of ocular tuberculosis to the nose and throat, published in the *American Journal of Ophthalmology,* October, 1914,[3] we pointed out the fact that ocular tuberculosis might be caused by infection from the nasal passages and their accessory sinuses. The several clinical reports included in that paper concerned selected cases in which the diagnosis of ocular tuberculosis had been established clinically and confirmed by subcutaneous test injections of tuberculin. These tests were followed by typical local reactions in the eye and by simultaneous positive inflammatory reactions in the nose. Some cases gave the usual history of an acute "cold" preceding the onset of the ocular inflammation. None of them showed any constitutional evidence of the disease. They were selected for the reason that only the nose and eye showed a positive reaction to tuberculin.

We have found this nasal reaction frequently in connection with ocular tuberculosis since we began to take notice of it. Only exceptionally was the nasal reaction absent.

In two patients (Mrs. J. M., aged thirty-six years, and Miss B. K., aged twenty-four years) suffering from tubercular cyclitis, neither showing any evidence of constitutional disease, we had direct evidence of recent exposure to tubercular infection. In the former by the frequent attendance on a friend ill with pulmonary tuberculosis, and in the latter through the sharing of room and bed with a guest afflicted with the same malady. In both, the diagnostic test injection of tuberculin showed the positive ocular and nasal reaction. We may readily assume the double reaction to be due to bacilli recently deposited in the upper air passages.

It is indeed strange that no attention has been given to the likelihood that chronic inflammations of the upper air passages may be due to the tubercle bacillus, when we consider that the bacilli must pass through and certainly lodge upon the mucous membranes in these passages before they ever reach the lung.

Again, if an active tubercular process exists in the lung, the bacilli which are expectorated again have their first opportunity for mischief in these passages before they are scattered broadcast outside. Of course, when the infection in any given spot of the nose or throat becomes so severe that tissue necrosis follows, we are prepared to diagnosticate a tubercular ulceration. Yet it is possible that tubercular inflammation may precede by a considerable interval any noticeable superficial necrosis.

These tubercular inflammations in the upper air passages should and do give a positive reaction on the injection of tuberculin under the skin, just as such reactions occur in the lung or eye or other tissues, but so generally have these reactions been ignored or overlooked, that the observations of Dr. Greenfield Sluder, who made the rhinologic examinations in the first cases of this series, represent true pioneer work without which this report would have been impossible. His skill and accuracy in the careful observation of the rhinologic reaction in these cases has made it possible to present facts rather than conjectures in this connection.

The method regularly followed in the study of these cases involved, first, the clinical diagnosis of the ocular condition. For all of these cases came under our care on account of some disturbance of their sight. Next, a general examination was made by an internist or a report obtained from the attending physician—often a Wassermann test was made. Also while this was being completed the rhinologic and ocular examinations were made repeatedly. Sometimes a von Pirquet skin test was made before the subcutaneous injection of tuberculin. Usually the first injection was old tuberculin in 1/1,000 milligram in the arm. The reactions, general and local, were then studied by the same observers for several days. The aggravation of the signs of inflammation in the ocular tissues indicating a positive local reaction included increased hyperemia, even the occurrence of hemorrhagic extravasations, increased precipitation on Descemet's membrane, extension of infiltrated areas, the eruption of new tubercles (as demonstrated in the iris or cornea with the binocular microscope), diminution of vision, etc. In recent cases very definite though slight reactions in choroidal infiltrations could be determined through the special advantages of the large Gullstrand ophthalmoscope. Slight reactions in retinal or choroidal lesions, especially when located near the macula, are very desirable, as a severe local reaction may result in serious and permanent impairment of vision, and thus defeat the prime object of our professional care.

In a recent case (Miss W. R., aged fifteen years) there were five or six nodules in the choroid, some of them at the temporal edge of the macula of the left eye, with exudate into the vitreous and deposits on Descemet's membrane. The test injection of tuberculin was very cautiously given on this account. It was followed by a positive increase of deposits on Descemet's membrane, with some reduction of visual acuity. After several days there was a marked lessening of the deposits on Descemet's membrane, and after the second injection the deposits on Descemet's membrane disappeared, and the cloudiness of the vitreous became so much less that vision was improved from 16/30 to 16/10.

During these first injections no nasal reaction was noted, though the case was under constant observation by Dr. F. C. Simon for that purpose. The family physician then gave a "double the previous dose" injection of tuberculin. He desired a more rapid increase of the quantity injected, as was his custom in other forms of tuberculosis.

Within forty-eight hours we had a strongly positive nose and throat reaction. Rhinologic examination showed abundant discharge coming from the left sphenoidal and postethmoidal sinuses. (It was the left eye that had been involved.) The general congestion and swelling of the mucous membrane in nose and throat was accompanied by so much swelling of the arytenoids that speech above a whisper was impossible. Fortunately no severe ocular reaction was produced. This clinical report is interpolated to suggest an answer to the question, "What constitutes a nasal reaction to tuberculin?" Naturally we may expect increased inflammatory symptoms in any mucous membrane infected by the tubercle bacillus.

In the above case the reaction was so strong as to be easily noticed by physician and patient. Extremely interesting and significant is the rhinologist's observation of copious discharge from the left sphenoidal sinus, as the left eye was the diseased one.

Not always is the nasal reaction so striking as in this case. So strong a rhinolaryngeal reaction is not desirable, for it was several weeks before this patient fully recovered her voice. The nasal reaction may be merely an increased localized hyperemia; but if that evidence is secured by a competent rhinologist, other conditions being duly considered, it is even more reliable than the changes in physical signs by which the internist determines a positive reaction to tuberculin within the chest.

It is hardly possible to exaggerate the significance of the almost constant finding of a localized positive reaction in the sphenoidal or postethmoidal sinuses on the same side as the affected eye. We know the close anatomic relations between these sinuses and the eye. For a score of years we have become more and more impressed by the clinical importance of this anatomic relation. Its importance in relation to ocular tuberculosis needs yet to be emphasized.

One of the earliest signs of exposure to tubercular infection in young children is the involvement of the lymphatic glands of the neck. How does it originate? Undoubtedly from the tubercle bacilli penetrating the mucous membrane of the nose and throat, whose lymphatic vessels lead to these glands. The orbit does not contain lymphatic vessels, but it has lymph spaces. Clinic and anatomic evidence combine to show that the lymphatic spaces of the orbital tissues are not always separate and distinct from the submucosa of the nasal sinuses. That they are usually so separated probably accounts for the fact that, after all, only a minority of the human family suffers from ocular diseases which originate in the nose.

Anatomic variations (dehiscences in the bony wall, etc.) which might open this channel for infection have been demonstrated. They may or may not be bilateral. Certain ocular conditions, such as central choroiditis (now often found to be tubercular), are not infrequently bilateral and symmetrical. Possibly a bilateral anatomic variation or defect exists which permits the same toxin or bacillus to be carried from the nose to relatively the same spot of each eye along the identical track in each orbit. Recurrence on the side first involved is more rare: probably because cicatrization after the first attack closes the avenue of infection.

In one of the cases reported in our paper above referred to, sixteen years elapsed between the involvement of the right and left eyes by a similar tubercular choroiditis of the macular region. Each ocular attack was preceded by an acute coryza.

In a more recent case (Mrs. W. H. W., aged forty-one years) we had established the diagnosis of tubercular choroiditis of the macular region in the left eye clinically, and by a perfectly definite local choroidal reaction following the injection of tuberculin. Dr. Sluder at the same time reported a positive reaction localized in the left sphenoidal sinus. During the third week of the treatment the patient contracted a "fresh cold," and it was accompanied by a choroidal infiltration near the macula of the opposite (right) eye, the character of which was determined by a further injection of tuberculin to be identical. Dr. Sluder at this time reported that a more general and severe nasal reaction followed the injection of tuberculin (0.001 milligram). This case was under the close observation of Dr. Walter Baumgarten at the same time, but showed absolutely nothing pathologic in the chest. Under continued tuberculin treatment the choroidal infiltration receded, with the recovery of perfect vision in each eye (16/10). No nasal treatment was administered by Dr. Sluder, in order that the record might show the effect of the tuberculin alone. The most plausible explanation is that a binocular infection by tubercle bacilli present in the mucous membrane of the nose and its sinuses occurred in this case. That the identical spot in the fundi of the two eyes was involved is much more readily explained by a similar anatomic variation on each side opening the same track through each orbit from the corresponding nasal sinus to the macula, than by any assumption that a latent bronchial gland or any other organ had furnished the accidental infection for the macula only in each eye.

A clinical fact of much importance is that the usual location of tubercular inflammation in the ocular tissues is in close relation to the lymph spaces. Ocular tuberculosis may, of course, involve the entire eye, but in many cases we find the attack limited to either the anterior or posterior segment of the globe.

Both the iris and ciliary processes are afloat, as it were, in the principal anterior lymphatic space in the eye. Lymph circulates freely through the substantia propia of the cornea. Verhoeff[5] demonstrated that tubercular infection may reach the cornea from the anterior chamber. Stock[4] showed the anterior scleral involvement to be secondary to ciliary inflammation.

The other important lymphatic space of the eye is the suprachoroidal space. Its name gives its anatomic relation—between the choroid and sclera.

It was formerly thought that these intraocular lymph spaces communicated freely with the lymphatic spaces of the orbit through the scleral openings for the emissary vessels. Such communication has been denied by later investigators, but it can hardly be said to have been absolutely disproven. In any event, these emissary openings are the points of least resistance. They exist at the posterior pole of the globe (near the macula) for the short posterior ciliary vessels; near the equator for the long posterior ciliary vessels and the venæ vorticosæ; and farther forward for the anterior ciliary vessels.

It is at these points that we may look for the beginnings of tubercular inflammations of the eye, and it is a well known clinical fact that there is where we usually find them. The fact that these inflammatory conditions, in spite of the intraocular swelling and congestion, usually show diminished intraocular tension, leads to the suggestion that in such cases there may happen to be open emissaria with free lymphatic communication extra- and intraocularly.

A third group of intraocular tubercular lesions are those of the optic nerve and retina. Here again we have in the sheath of the optic nerve lymph spaces which are brought into close anatomic relation to the sphenoidal and postethmoidal sinuses in the canalus opticus.

Our group of cases included only one of probable tubercle of the optic nerve, but the case was seen in the later stage, and even then no arrangement for close study was possible. However, from the anatomic relations, our theory for the genesis of ocular tuberculosis would apply with equal force to this group.

Perhaps the strongest evidence that tubercular inflammations of the eye are closely dependent on nasal infection is the curative effect in the eye following nasal treatment, both medical and surgical.

Though the history of several cases might be given to corroborate this statement, we shall refer to only one which illustrates it strikingly.

Miss L. Z., white, native of Illinois, aged nineteen years. First seen November 22, 1907. Failure of vision in right eye for three months. Right eye vision, 3/48, excentric; left eye vision, 15/19.

History negative; had lived on farm all her life. Parents living and apparently healthy; same was true of five brothers and two sisters. Has headaches and pain in and over right eye, which were referred to "womb trouble" by some physician whom she had recently consulted in Chicago.

Ophthalmoscopic examination revealed extensive disseminated choroiditis in right eye, confluent in macular region, more discrete near equator; left eye, nothing pathologic; media clear, right and left.

In the absence of definite indications, began use of $HgCl_2$, grain one-twelfth, in solution, well diluted, t. i. d. Dose reduced to grain one-twenty-fourth in three days, and discontinued after two weeks on account of gastric discomfort. Substituted capsules containing quinin, strychnin and ferri reduct., with entire satisfaction.

Pain in right eye and head continued to recur, especially at night. Partial relief from headache followed use of correction for myopic astigmatism in left eye. Prescribed:

Right eye, plane glass.

Left eye, — 0.25 sph. — 0.75 cyl. ax. vertl.

A week later (one month after first examination) returned, complaining of more pain in head and "flickering" before both eyes. With above glasses vision in right eye was 3/75, excentric; in left eye, 15/10 +. Ophthalmoscope reveals a new "active" choroidal infiltration on nasal side of disc of right eye. Nothing pathologic in left eye.

She was now placed in St. Luke's Hospital, under the general care of Dr. Walter Baumgarten. An injection of old tuberculin, 1/1,000 milligram, on the seventh day was followed with a temperature of 101° within twenty-four hours. This was more than one degree higher than any record, before or after the injection, during the two weeks she was at the hospital. The reaction in the ocular fundus of right eye was strongly positive in the new lesion above noted. In the remainder of the fundus, which was almost covered with old choroidal scars, we could not be so certain of any change.

Dr. Baumgarten found absolutely no reason to suspect any tubercular lesion in the lungs. However, the febrile reaction was followed by increased local pain in forehead and behind the right eye. The subsequent history readily explains the pain as caused by a positive reaction in the nasal sinuses, but at that time no nasal examination was made.

The therapeutic use of hypodermic injections of tuberculin R was now begun by Dr. Baumgarten, for the control of the choroidal inflammation, with a dose of 1/2,000 milligram. Five days later both the pain and "flickering" were less, and the ophthalmoscope showed the edges of choroidal infiltration becoming sharply defined; edema and congestion less in right eye. Left eye continued normal throughout these tests.

One month after beginning the therapeutic use of tuberculin, the patient reported that she could now "see through the black spot" which had covered central vision in right eye. On trial right eye vision was — 3/30 + (central vision) without glass.

Repeatedly the injection of tuberculin was followed by pain over or behind eyes, but the fundus showed continued improvement until the end of the eighth week of the treatment, when a small round patch of fresh choroidal infiltration, about one-third size of disc, was noted in the upper nasal quadrant of right eye near equator.

Three weeks later no active lesion remained in fundus of right eye. Right eye vision was 3/24 without glass, or 16/48 with — 2. sph., which was now placed over right eye in her spectacles.

As the headache was quite severe after the injection of tuberculin (1/1,000 milligram) on March 11th, no further injection was given until April 6th (three months after beginning tuberculin treatment), when the same dose was repeated. No headache present on following day, but it returned on waking the second day for one and one-half hours with marked frontal tenderness.

Examination was then made by a rhinologist, who reported obstruction on the right side, due to enlargement of the tubercle of septum. He advised merely palliative treatment for the time.

New patches of choroidal infiltration appeared occasionally for nearly two years, and were followed up by the use of tuberculin injections, which seemed to hasten their delimitation and cicatrization. Since October, 1911, no active lesion appeared in right eye.

The patient continued to suffer severely, by spells, with headaches which rhinologic examination seemed to connect with the obstruction of the right middle meatus. As repeated nasal cauterizations gave no permanent relief, a septum operation was. done by another rhinologist whom she consulted during absence from the city of the one who had made the first examination. It was apparently without benefit.

While spending the winter (1911) in Texas, her throat was inflamed and a tonsillectomy was done on her return to St. Louis.

None of these operative interferences nor the medical treatment cleared up the headache which antedated the attack of ocular tuberculosis in the right eye. A particularly violent spell of headache with general malaise followed the resection of the nasal septum.

Neither of the several rhinologists who previously treated the patient manifested any interest in the condition of the sphenoidal sinuses, per se, as a cause for these headaches. However, as they cleared up entirely after the special surgical intervention of Dr. Sluder for the opening and drainage of these sinuses, we are justified in assuming that the sphenoiditis had been the more or less active cause of the cephalalgia from the beginning.

The last ocular examination before the recent attack in the left eye was made in March, 1914. No active lesion was present in the right eye. Extensive retinal and choroidal atrophy with patches of dense pigment proliferation throughout the entire fundus except in the extreme equatorial zone was found. At that time the left eye showed nothing pathologic.

Right eye, with glasses (— 3.5 sph.), had vision of 16/150 (excentric). Left eye, with glasses (— 1.25 cyl. ax. vertl.), had vision of 16/10.

PRESENT ATTACK.

April 30, 1915, patient returned, stating that vague disturbance of vision of left eye had begun several months ago. About two weeks ago noticed that "following word" was cut off and that in looking at the palm of her hand she could not see her fingers.

Right eye, with glasses, had vision of 3/120. Left eye had vision of 16/10.

Ophthalmoscope shows no active lesions in right eye. Left eye showed disseminated choroiditis, confluent in patches, extending over entire temporal half of fundus. The more recently infiltrated areas were immediately on the temporal side of the macula.

The finger-like projections of the choroidal infiltration in certain directions confirmed the observations of Jessop,[6] that choroidal tuberculosis probably spreads in the direction of lymph currents.

A rhinologic examination, made at once by Dr. Greenfield Sluder, showed purulent discharge coming from both sphenoidal sinuses.

The constitutional examination was made the same day by Dr. Baumgarten, who then gave a test injection of 1/10,000 milligram of old tuberculin. The next day the patient showed a slight rise of temperature, general malaise and nausea. The ocular micrometer scale of the Gullstrand ophthalmoscope showed that the margins of the infiltrated areas had approached the fovea centralis at least two spaces. The usefulness of this micrometer scale in just such tests was referred to in our preliminary notes.[7] The nasal reaction was feebly positive. A stronger reaction in the eye would have been utterly destructive. Therefore, only one-tenth the usual amount of tuberculin for test injection had been used. After several days there was no further advance of the line of infiltration.

The second injection of tuberculin (1/10,000 milligram), however, was followed by a reduction of vision to 16/60 +, and a corresponding increase of the infiltrated area in the choroid, which now extended into the macula. In view of the untoward result following the use of the tuberculin injections, Dr. Sluder consented to do a radical operation* for the extensive opening of the sphenoidal sinus on the left side on May 14th, two weeks after his first examination.

Five days later the ophthalmoscope showed the choroidal infiltration apparently arrested at a vertical meridian passing through the center of the macula. The injection of tuberculin was now repeated with no unfavorable reaction in the fundus.

Four days later the injection of tuberculin was repeated and the dose doubled (1/5,000 milligram). On the second day after this injection vision in the left eye had improved to 16/19. Two days later it had again fallen off to 16/38. The next injection of 1/5,000 milligram of tuberculin was followed by a slight reaction in the fundus and no improvement of vision.

During the following week the patient was seen in consultation by Dr. John Green, Jr. A Wassermann test proved negative.

The infiltrating process in the fundus continued to advance in spite of a repetition of the tuberculin with only one-half the dose. Vision had fallen off to 16/120.

June 7th, the use of tuberculin was temporarily stopped and the patient was put on "forced" feeding and absolute rest at St. Luke's Hospital. In the absence of Dr. Baumgarten from the city, Dr. Fahlen looked after the general treatment. After two weeks vision had improved to 16/60, and the ophthalmoscope showed the choroidal process apparently arrested between the disc and macula. The patient had gained in weight and was subjectively much improved.

One week later the ophthalmoscope showed extension of the process above and below the disc, and vision reduced to 16/120.

No doubt, as G. S. Derby[8] has urged, the general condition of patients suffering from ocular tuberculosis should receive careful attention. The course of some of our cases has proved the value of his recommendation, but the proper local treatment must be had, as the further history of this case amply demonstrates.

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*The operation done by Dr. Sluder for the opening of the sphenoidal and postethmoidal sinuses is one devised by himself. It is being draughted and will shortly be described and published by him.

The special hospital care of this patient was continued and her general condition improved, but on September 1st ophthalmoscope showed new infiltrations extending toward the disc from the equator on the nasal side. Only the upper nasal quadrant remained free from infiltration. Tuberculin injections had been given up since the injection of 1/50,000 milligram seemed to be followed by an unpleasant reaction.

Vision of right eye was 3/19 +, and of left eye, 3/19 (?). In other words, the sight of the eye that had been destroyed several years ago, was now better than the eye only recently attacked.

The patient was permitted to go to her home on the farm for several days, and the use of unguentum hydrarg., half dram daily, was advised. Practically no improvement could be noted in her condition three weeks later.

At this time Dr. Sluder returned to the city and reexamined the patient. He reported an active sphenoidal process involving the right sphenoidal sinus, which he presumed might affect the left eye, as the left sphenoidal sinus had been very small. The possibility of the right sinus extending over and being in contact with the inner wall of the left orbit had to be considered. One week later, under nasal treatment by Dr. Sluder, vision had improved to 16/75 (centrally) in left eye.

A week later patient reported that after a fresh cold vision had been subjectively worse. The ophthalmoscope showed more swelling, and vision was reduced by test to 16/150 (excentric). Patient was now urged to have the radical sphenoidal operation done on the right side.

Dr. Sluder performed the operation October 18th. Three days later vision had improved to 16/60, and has since been maintained at 16/60 to 16/48 for two months. No further tuberculin has been injected. Central vision has improved sufficiently to enable the patient to read newspaper print slowly with good illumination.

The ophthalmoscope shows the process in the fundus absolutely arrested. A large portion of the upper nasal quadrant still remains entirely free from disease. As the markings of choroidal cicatrization become more definite, small islands of healthy choroid and retina are noted scattered over the fundus generally. There remained no sign of any active lesion in the choroid.

The clinical history of this case leaves no doubt as to the origin of the choroidal infiltration, its character and its favorable response to direct nasal treatment and operation.

Dr. Sluder has performed his radical operation for opening the postethmoidal and sphenoidal sinuses several times for us in ocular tuberculosis and other ocular conditions. For the first day or two the ocular symptoms are usually aggravated. In four or five days the ocular disease is arrested, accompanied by improvement of vision.

Usually the operation on a given side of the nose affects only the ocular condition on the same side. In this case the operation on the left sphenoidal sinus was followed by an arrest of the active choroidal disease in the left eye, but the unusually large and actively inflamed right sphenoidal sinus had to be opened before the choroidal inflammation was entirely stopped in the left eye. The absence of reaction in the right choroid is explained by the extensive cicatricial formation which followed the attack on the right eye beginning nine years ago. Whether the Sluder operation will prevent a recurrence in the left eye remains to be seen.

The dose of tuberculin in the first attack involving the right eye seemed to bring about prompt delimitation of the infiltration and cicatrization, but it did not prevent destructive recurrences.

In this last attack on the left eye the use of tuberculin in doses equal to those used in the first attack was impossible, on account of the dangerous reaction which followed even much smaller doses. The doses which were tolerated—about 1/50,000 milligram—might just as well have been omitted, so far as any noticeable benefit from their use was concerned.

In this respect this case is almost a unique exception among all the cases of ocular tuberculosis which have been under our care for the last decade. Our use of carefully graduated doses of tuberculin has produced uniformly good results. We did not encounter another case where such small dosage produced any unfavorable ocular or general reaction.

The microscopic examination of the sections of the sphenoidal wall have not been completed. In patches they showed chronic inflammatory infiltrations with slight tissue necrosis and giant cell formation, but no typical tubercles or tubercle bacilli have thus far been found.

The recognition of nasal and accessory sinus conditions as a probably direct cause of most of the ocular tuberculosis which we are called upon to treat should be of positive value, both for the prophylaxis and treatment.

Also it makes a substantial addition to the long list of ocular conditions which demand intelligent cooperation between the oculist and the rhinologist for the benefit of the patient.

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X.

TUBERCULOSIS OF THE RETINA, RECURRING HEMORRHAGE AND RETINITIS PROLIFERANS.*

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Recurring hemorrhage into the retina and vitreous in young persons has remained a good deal of a mystery in modern ophthalmology. Although the clinical picture, course and prognosis were as definite as those of most intraocular diseases, its etiology remained unknown and its treatment extremely unsatisfactory. Tending to continue the confusion and obscurity concerning it, ophthalmoscopic study of the condition present is hampered by the complete hiding of the fundus much of the time by the clouding of the vitreous, and by the scarcity of reports of eyes which come to histologic examination; and of such eyes it was sometimes reported that no pathologic alteration of the vessels could be found.

But in the last few years our acquaintance with the condition has been much extended and improved. Careful prolonged ophthalmoscopic studies of the fundus have been made in several cases, at such intervals between the hemorrhages, and of such portions of the retina as might be visible, until a definite series of fundus changes has been repeatedly recognized. More thorough studies in the pathologic histology of the eyes obtained for examination have revealed definite pathologic changes in all the later cases. Observations on the coagulability and cytology of the blood, as well as on blood pressure, have tended to negative the suppositions of general hemic or circulatory disturbance. Meanwhile the specific tests, as for syphilis and tuberculosis, have given valuable evidence as to the presence or absence of these specific discases. The time has come for a review of our knowledge of it, and a careful study of this condition.

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*Read at the meeting of the Colorado Ophthalmological Congress. Denver, Colorado, July 22nd and 23rd, 1915.

In the classic paper of Eales[1] upon "Primary Retinal Hemorrhage in Young Men," the condition was well characterized thus:

"When first seen the vitreous was opaque from hemorrhage into it. The fundus oculi was either invisible or visible only throughout a small portion of the upper part of the periphery, and here extravasations of blood were found in the retina, either quite recent or partially decolorized."

"There was often a rapid diminution of the opacity of the vitreous, followed by a sudden recurrence of opacity from fresh hemorrhage after a few weeks or months. Many such recurrences occurred. In each case vision appeared to suffer only in proportion to the opacity of the vitreous. Between the attacks it sometimes recovered its normal acuity, though muscæ were complained of, and opaque shreds were still discoverable in the vitreous. The vessels in each eye were found to be large and tortuous, especially the veins, which were also remarkably dark colored."

"The extravasations were almost invariably large and of round or regular form, not flame-shaped. They could often be seen to have proceeded from venous radicals which were obscured by them. The ultimate result of these repeated extravasations was the formation of large whitish, and sometimes quite glistening, patches of degeneration at the periphery of the retina, with some degeneration of the choriocapillaris, and occasionally small areas of detachment of the retina. In no case has any condition like retinitis been seen to precede or to accompany these hemorrhages. In some cases permanent opacity of the vitreous resulted."

Eales' description was based upon eight cases, yet he noted that the condition must be rare, no case having appeared in a clinic of twelve thousand cases of eye disease. His patients were all males between fourteen and twenty years of age. But in discussing the report of Nieden's[2] case, before the Heidelberg Congress, a few months later, Schweigger stated that he had seen the same condition in young women. Eales attached importance to the slow pulse he noticed in his patients, yet he noted it as increasing in frequency to seventy-two or eighty-two per minute while under observation. He found no evidence of hemophilia, or of any other blood condition known to be a probable cause of hemorrhages. He excluded any family history of gout, to which Jonathan Hutchinson attached importance. But he noted, "all these lads were much troubled with dyspepsia, low spirits, want of energy, and feelings of lassitude"; and he ascribed the condition "to a neurosis affecting both the circulatory organs and the digestive system."

Similar hemorrhages into the vitreous, of choroidal, ciliary or unknown origin, have been frequently described. It is not desirable to draw any sharp line between them and the cases under consideration, for they are probably of the same essential character. But the retinal cases offer during life the better opportunity for careful study of the pathologic conditions attending such hemorrhages. My own interest in this subject has been especially arôused by the opportunity to study through the greater part of the past year the following cases, both patients being women:

Case 1.—Miss D., aged twenty years, was kindly referred to me by Dr. P. Somers Smyth, of Boston, who wrote: "I first saw Miss D., September 23, 1914, complaining of failure of vision in the right eye, coming on in a very few days. There were many floating opacities of the vitreous, making it difficult to see the fundus, but I managed to see hemorrhages and exudate out and down and around the macular region. The veins were somewhat dilated. I immediately sent her to an internist for examination and treatment. The urine was negative."

October 17, 1914. The right eye seemed about as when she went to Dr. Smyth. There was no pain, no external redness, and no headache. Two years before there had been removed with the electric cautery, by a surgeon in San Francisco, a tiny gray growth on the outer limbus of her right eye. She was seen only two or three days by the doctor after this. She had suffered no pain. Vision is: Right eye, fingers at six inches; left eye, 5/4 plus.

Ophthalmoscopic examination shows in the right eye large retinal vessels; and the outlines of the disc are seen through a general vitreous haze, which in part resolves itself into a web of opacity. No hemorrhage or localized exudate was made out, nor corneal deposits. In the left eye there was a slight suspicion of subnormal sharpness of all details. She has marked pustular acne; some flatulence, no constipation. Calomel was prescribed in divided doses, followed by one-tenth of a grain three times a day. She was referred to Dr. Philip Hillkowitz, who reported a negative Wassermann, and to Dr. H. H. Champlin, who reported a negative von Pirquet test.

October 22d. Vision: Right eye, 1/20 fugitive; left eye, 5/3 partly. Vitreous opacity in the right eye less marked.

Up to this time, in my absence, she had been seen by my associate, Dr. Wm. H. Crisp.

October 28th. Vision: Right eye, 4/60 steady; left eye, 5/4. Right, vitreous still hazy, with traces of red in the opacity.

October 30th. Under homatropin and cocain, pupil six millimeters in diameter. Vision of 5/40 in the lower part of the field. No hyperemia.

Ophthalmoscopic examination shows below the center of the vitreous a greenish white mass as large as the disc (one and a half to two millimeters) indefinite with haze, more dense below, less above, but with some haze throughout the vitreous. The mass seemed isolated from the retina, only slightly mobile. No choroïdal lesion seen. Still taking calomel, one-tenth grain, three times a day. Dionin every second night.

November 21st. Ophthalmoscope: More definite white masses in the lower vitreous, other parts being less hazy. Vision: Right eye, 6/30, not improved by glasses; left eye, with + 0.50 s. ○ — 0.25 cyl. axis 15°, equals 5/4 mostly.

November 27th. The injection of one milligram of old tuberculin raised the temperature from 98.1° to 99.1°. No chill or sickness. No change in vision was noticed, but the good vision in the other eye would conceal any impairment due to focal reaction.

November 28th. Right eye, vision 5/60. The white spots connected with and concealing the vessels have become more vascular; and a few minute retinal hemorrhages are to be seen. The optic disc is concealed by a pink swelling.

December 3d. Feeling well. Right eye: Retinal thickening more diffuse; one small hemorrhage noted. Hyperemia less about the white spots. But the disc is covered by a grayish red swelling with fine tortuous vessels in it, and extending downward. In the upper macula rather faint grayish white dots are arranged in a star figure. Main retinal vascular trunks are large, especially the veins. The disc is entirely hidden. There are some small black masses in the vitreous below. Left eye: Vessels large, discs dull gray. Has been entirely free from headache.

December 10th. Vision: Right eye, 5/40; left eye, 5/4 mostly. Media as before. Swelling entirely hides the disc, although only 1 D. hyperopic. It is extremely vascular, with fine tortuous vessels. Some retinal veins are very broad and pale. Blood pressure 116; urine normal.

December 31st. Vision: Right eye, 5/60 uncertain. Ophthalmoscope: Right disc entirely covered by a mass of fine, new formed vessels; a similar mass down and in from disc. Macula covered by a vitreous cloud. General vitreous rather clearer.

January 1, 1915. Vision: Right eye, 5/60. Ophthalmoscope: Disc dimly seen through new formed vessels, and remains of hemorrhage. White masses below and forward, less noticeable.

February 2d. Noticeably clearer the last week. Vision: Right eye, 5/22. Disc still veiled and red with new formed vessels. Lower nasal vessels covered with exudate beginning two disc diameters forward from the disc, with remains of hemorrhage, probably old, but previously veiled. Upper nasal macula shows two score of spots like albuminuric retinitis, but not strictly radiating from the fovea. Several small white masses in peripheral vitreous.

February 13th. Vision: Right eye, 0.3. Spots in macula much as before. Upper temporal vessels for one-half disc diameter from disc hidden by exudate, with a little blood in it. Lower vessels clearing: blood near them all absorbed.

March 4th. Vision: Right eye, 0.3. Upper vessels clearing. New formed vessels seen in front of upper retinal vessels.

March 24th. Vision: Right eye, 0.4. Light streaks begin to appear in the retina. Large veins contracting.

April 12th. Vision: Right eye, 0.5. Right disc almost clear at the temporal margin, still swollen and indefinite in other directions. Vitreous almost clear.

April 26th. Vision: Right eye, 0.6. Discs clearing slowly;

nearly all white dots gone from macula; only one group remains at the lower nasal boundary. More distinct streaks alongside of the lower temporal vessels. Upper temporal vessels still large. Dionin once a week.

May 5th. Temporal veins still large, but growing less so. Other vessels not enlarged. White spots almost gone from macula. Dionin two per cent twice a week.

May 17th. A band of white tissue extends almost horizontally across the upper one-sixth of the disc. It is vascular and reaches 4 D. in front of the disc. Veins still slightly large; lower temporal vein has white connective tissue streaks beside it as broad as it is. A very few faint dots remain in the lower nasal part of the macula. The upper temporal vessels are almost clear.

Beginning December 12, 1914, this patient received nineteen therapeutic doses of tuberculin, administered by Dr. H. H. Champlin, at intervals of one week or more. The dose was gradually increased from one-tenth to three-tenths milligrams.

Case 2.—Mrs. W. R. L., aged twenty-seven years, was first seen December 28, 1914. She had always seen well until eight months before, when vision in the left eye gradually got dim. She first noticed a speck to the temporal side. Two months later the right eye began to get dim gradually, starting in the same way. The left eye seemed to get better, when vision blurred again all at once. No pain except occasional twinges the past week. Vision: Right eye, light perception; left eye, 1/45.

The ophthalmoscope showed the vitreous hazy, the retina and discs swollen. No evidence of syphilis or tuberculosis. Had right ear trouble two years ago; right mastoid tender, but no earache lately. Dr. W. C. Bane examined her and reported no ear or sinus disease, and that the mastoid seemed sound.

December 29th. Under homatropin, pupils seven millimeters. There are white and gray masses in the vitreous. Right, one to nasal side in advance of the equator. Nasal side most opaque, upper temporal clearest. Disc red and swollen. Upper temporal vein very large and very tortuous. Left, distinct remains of hemorrhage toward the disc only, a white oval one-half disc diameter with a few small vessels. Near it new formed vessels in vitreous, a tuft of large vessels coming well forward.

January 18, 1915. Referred to Dr. H. H. Champlin, who gave her a diagnostic injection of old tuberculin. This was followed by one degree rise of temperature.

January 19th. Vision: Right eye, fingers at three inches; left eye, 5/45 partly. Right, more retinal reflex, dense haze to the nasal side, discs still hidden. Notices specks before the eyes. No fresh hemorrhage. Had tuberculin injection on the 18th. Today, headache, nausea, and twinges back of the ear.

February 2d. Vision: Right eye, fingers at three inches; left eye, 5/12. Still great clouding of the nasal part of the right vitreous and periphery of the left vitreous. Discs still hidden. No fresh hemorrhages.

February 5th. On the night of the 2nd, one day after a dose of two-tenths milligram of tuberculin, noticed a little red before the right eye. Yesterday a dark stringy cloud came up before the left eye; gradually coming for two hours. Vision: Right eye, fingers at two inches; left eye, 1/60. The eyes had been better before this. Pain in the right ear.

Ophthalmoscope: Right eye, many masses of retinitis proliferans, rounded patch of thin hemorrhage, one-half disc diameter, near the disc, below and toward macula. Left eye, general smoky veiling of fundus in all directions, least in upper nasal vitreous. No large mass seen.

February 12th. Vision 2/60. Smokiness in the left less, nasal side almost clear. Ordered dionin every other night.

February 23d. Vision: Right eye, fingers at six inches; left eye, 5/30. Left vitreous not smoky; large decolorized shreds of clot above and forward.

March 10th. Vision: Right eye, fingers at ten inches; left eye, 5/15. No fresh hemorrhages. Left still hazy forward. Right, streaks and white lines along vessels.

March 31st. Eye continued to improve until yesterday morning. Was given three-tenths milligram tuberculin the day before. Vision: Right eye, fingers at one foot; left eye, 2/200.

April 21st. Vision: Right eye, 5/60; left eye, fingers at one foot.

May 8th. Right eye worse the last hour. Media clear.

Vision: Right eye, fingers at two feet; left eye, fingers at one foot. Tuberculin, three-tenths milligram, had been given three days before. Upward a mass of gray white, 5 or 6 D. hyperopic, stretches toward periphery, with clear vessels near the disc, which are very slender peripherally, with white lines bordering each.

May 12th. Right eye has gained perceptibly. Both clearing, especially left eye. White masses in each. To have tuberculin once in two weeks.

May 21st. Vision: Right eye, 5/60 partly; left eye, fingers at one and one-half meters. Right eye, white mass upward with large tortuous vessels that have grown smaller. Left eye, mass above (seen with a plus 10 D.) flecked with white, like renal retinitis. But vessels show light streak and are numerous. Dark background.

June 3d. Vision: Right eye, 5/60 mostly; left eye, 5/36. White mass up and out from disc, 5 D. hyperopic. Very tortuous vessel. Left eye almost free from smokiness, but details indistinct. White mass in front of disc. No reaction from injection yesterday.

June 11th. Vision: Right eye, 5/60; left eye, 5/20 partly.

July 14th. Vision: Right eye, 3/60; left eye, 5/30 partly. Ophthalmoscope: No general clouding in right eye, little in left eye.

Beginning January 11, 1915, this patient was given by Dr. H. H. Champlin, at intervals of one week or more, twenty therapeutic doses of tuberculin, gradually increased from one-tenth to four-tenths milligram.

Among the recently reported cases, which seem most closely allied to those given above, the following may be mentioned:

Cords[3] saw two that he regarded as cases of uncomplicated retinal periphlebitis. He noted that the veins were irregular in caliber, tortuous, with white sheaths and white patches, and retinal hemorrhages adjoining them. In one of his patients both eyes were affected, and the condition improved rapidly under tuberculin treatment. He brought together fourteen cases of probably similar character; six were probably due to tuberculosis, seven were of unknown etiology, and one patient had hereditary syphilis.

Igersheimer,[4] under the heading "Tuberculosis a Cause of

Retinal Periphlebitis of Adolescence," reports three cases. Two of his patients suffered from pulmonary tuberculosis.

A case of juvenile retinal periphlebitis, with a positive tuberculin reaction and a negative Wassermann, is reported by Harms.[5] The lesions were located peripherally in both eyes. Central vision remained normal the whole time that the patient was under observation.

In one of the two cases of retinal tuberculosis reported by Knapp[6] the accompanying plate shows white spots in the region of the macula, similar to those seen in Case 1. Both his cases gave general (and probably focal) reactions to tuberculin.

Agricola and Thies,[7] in an eye examined histologically after healing of tuberculous lesions of the cornea and iris, found chronic tuberculosis of the ciliary body; and that the retina seemed to have become infected through the vitreous. The retinal tubercles were chiefly perivascular, and a condition of retinitis proliferans was found near the optic disc.

Stock[8] saw retinal hemorrhages that he thought due to a general tuberculous infection, in a case of miliary tuberculosis.

Gilbert[9] reports three cases of retinal periphlebitis which seemed to show that tuberculous disease of the anterior segment of the uveal tract may cause phlebitis of retinal as well as uveal veins.

Fleischer[10] found some of the veins filled with tuberculous débris in an eye which a year before had shown extensive retinal phlebitis with hemorrhages. The patient, a man of thirty-six years, suffered from pulmonary tuberculosis.

Oloff[11] reports two cases of tuberculosis of the retina, especially involving the veins, in robust young sailors.

Onishi[12] has recorded a series of cases of choroidal tuberculosis, in which the macula showed white spots like those of albuminuric retinitis.

In tuberculous lesions in general there is noticeable absence of vascular reaction. The active tubercle remains comparatively free from new formed vessels. The vascular walls suffer weakening and ulceration. The tendency to hemorrhage is one of the prominent early characteristics of tuberculous disease, appreciated as such by the laymen. On the other hand, healing of the tuberculous lesion, when it occurs, is characterized by connective tissue formation. Connective tissue forms around the tubercle, isolates it, and in the end may wholly replace it.

In the well recognized association of intraocular hemorrhage and subsequent connective tissue formation, constituting retinitis proliferans, we have the same association of pathologic processes. The few cases that have been studied anatomically, the response of a larger number of cases to the specific tuberculin test, and the relative recoveries that are now recorded to the credit of the recognized treatment for tuberculosis, give sufficient basis for the view that tuberculosis, chiefly of the retinal vessels, is the essential nature of the clinical condition represented by the above cases of recurring retinal hemorrhage in young persons followed by retinitis proliferans.

January, 1916. There has been no recurrence of hemorrhage in either case. The appearances now presented are typical of retinitis proliferans. Vision has risen in the affected eyes; in case one to 0.7; and in case two to right 0.06, left 0.35.

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XI.

TRAUMATIC RUPTURE OF EYEBALL, COMPLETE ANIRIDIA; PRESERVATION OF LENS, WITH PRACTICALLY NORMAL VISION.*

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Traumatic aniridia is secondary evidence of a contusion to the eye, due either to a blunt or sharp instrument. Injuries resulting in a break in the continuity of the structures forming the envelope of the eyeball are referred to as incised, perforated, or lacerated wounds. The first two are due to a direct insult to the bulb. The latter, however, is the result of an indirect force—as, e. g., rupture of the sclera.

In general, the position, shape, and size of direct injuries depend largely upon the size, direction, and force of the instrument. They most frequently involve the cornea. Indirect injuries are largely dependent upon the anatomic structures of the tissue. They are much more typical and assume a more constant position and character. They show a predilection for the upper inner quadrant, paralleling and a few millimeters posterior to the limbus. The resistance offered by the trochlea and the weakening of the sclera at this position, because of the grooving occasioned by Schlemm's canal, are anatomic factors markedly determining the location.

It is with this type of rupture, followed by a complete aniridia, that we are at present concerned. The writer desires to record the case history of such a patient, and incorporate therein the condition present twenty-one months following the injury.

On the evening of December 25, 1907, there was admitted to the writer's service, at the Chester Hospital, Chester, Pennsylvania, A. H., a laborer, aged fifty years. The patient was in a marked state of intoxication. One hour previous to his admission, while attempting to mount a chair, he tipped over, striking his right eye on the projecting corner of another plain kitchen chair.

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*Read at the meeting of the Colorado Ophthalmological Congress, Denver, Colorado, July 22nd and 23rd, 1915.

The patient was very dirty. Both lids were markedly ecchymosed, swollen, and moderately separated, the separation being occupied by clotted blood, débris, etc. Owing to a swelling of the lids there was an absence of the flattening so frequently observed in a ruptured globe. The conjunctiva was everywhere infiltrated with fresh blood.

To the nasal side, a few millimeters posterior to the limbus, was a large curvilinear wound one and one-half centimeters in extent, the major portion of the wound occupying a position above the horizontal meridian. The inferior end of the wound curved about one millimeter into the corneal tissue. The wound contained clotted blood, with presumably a few shreds of iris tissue, and a small prolapse of blood stained vitreous. Regarding the exact identity of many of these structures the writer was not certain, owing to the entire field being obscured by blood clot. The cornea was flattened and the tension of the globe soft. No view of the media or fundus was obtainable, owing to the presence of fresh blood in the anterior segment.

The grave possibility of an immediate enucleation was considered by the writer and the patient's family. So strenuously, however, did the latter resist such proposals that for the time it was not insisted upon. The parts were flushed with boric acid solution. All débris in the wound, so far as possible, was gently removed by moist pledgets of cotton. The small prolapse of blood stained vitreous was snipped off. The conjunctiva was smoothed out, and one fine superficial suture was used to draw the tissues together. A light bandage and ice compresses were applied.

The following morning conditions looked so favorable that the writer determined to hold the question of enucleation in abeyance for a time and make an effort to save the organ; more, however, to satisfy the patient's family than with any remote thought of securing a useful eye. Within a few days the anterior chamber reformed and the wound healed.

At no time during the healing process was there severe pain or marked inflammatory reaction.

January 7, 1908, with the ophthalmoscope, a strong plus lens in place, an indefinite reddish reflex was obtained from the corneal area. Attached near the upper extremity of the wound was a shred-like waving tissue in the anterior chamber.

January 21st, vision was 5/60, but not constant. The wound was firmly healed. An indistinct view of the fundus was obtained. No iris tissue was observed save the waving shred-like fragment above noted.

The patient continued under treatment at frequent intervals up to August 22, 1908. During this time there had been continued improvement. Vision 5/21, tension normal. Complete absence of iris tissue. At the angle of attachment of the iris the deeply pigmented ciliary processes showed, except at the site of the injury. Passing from this structure to the edge of the lens were to be seen the radiating fibers of the zonula. The lens was clear, save for a hazy nucleus. Many fine and a few large, shred-like vitreous opacities were present, apparently in the anterior portion. No deep fundus changes were made out. The patient wore a smoked glass before the eye, owing to the annoyance caused by excessive light.

The patient passed from observation, and no further notes were made until the writer sent for him on September 22, 1909. At this examination the eye was perfectly quiet and the lens clear, except for a haziness of the nucleus (age, fifty years). There were still present fine and a few large shred-like opacities, apparently in the anterior portion of the vitreous. The patient had discarded the smoked glasses. Correction with a lens, + cyl. 2, ax. 150°, gave him vision of 6/6 pt, and with + sph. 3. in addition, he could read Snellen .50. This correction with a lens for the sound eye was used comfortably and successfully at his work as a laborer in an iron foundry.

In recording the above case history, attention is called to the unusual features of a complete traumatic aniridia, lens unharmed and practically no impairment of vision.

It is difficult to be optimistic in dealing with a condition so serious as extensive rupture of the sclera. These injuries suggest the question of the adoption of a radical or of a conservative surgical measure. Brunetière, in his paper, does not agree with Fuchs and many other eminent eye surgeons "that the majority carry a bad prognosis."

The literature referring to the above noted features in this class of injury to the bulb is quite meager. Possibly forty or fifty cases of aniridia, with aphakia, have been reported since Williams'[1] case in 1864. The number of patients in which the lens was intact, with useful vision, is decidedly less.

Chisholm[2] of Baltimore, in 1872, reports the history of a man thirty-seven years old, in which the cornea was penetrated by a finger nail, the iris being drawn out. Lens clear, accommodation good. The eye was myopic. The patient could read No. 1 Jaeger type at four inches, and No. 20 at eight feet. With a ten inch lens, near point three inches, far point five and one-half inches.

Folker,[23] in the same year, reported a patient receiving a wound of the lower outer edge of the cornea. There was complete absence of the iris. Lens clear and in situ. Vision through a one-sixteenth inch aperture was Jaeger No. 16.

Rowan's[8] patient sustained two separate injuries to the same eye within five days of each other; the first by a piece of metal three-eighths of an inch square, which it was believed detached the iris; the second wounding the cornea and removing the iris. A few lens opacities were present, accommodation was retained, and vision was 6/24.

Guilford's[9] patient also received two injuries within three months of each other; the first causing a penetrating wound of the cornea, with complete aniridia, but no injury to the lens or deeper structures; the second due to a blow over the closed lids. The final vision was 20/30.

De Beck reports two patients who sustained blows producing rupture of the cornea and extrusion of the iris, without injury to the lens.

In another patient reported by Szili, a vertical linear wound of the cornea, with ecchymoses of the lids and conjunctiva, was produced by striking the eye against a projection. Recovery was complete in five weeks; but the iris had entirely disappeared, while the lens remained in its normal position and was transparent, except at a small spot to its inner side and above the equator. In the vitreous there were floating opacities. The vision was 6/36 with plus 4.

In Businelli's patient, after the blood in the anterior chamber had been absorbed, the iris could not be found, but the lens retained its normal position, and the patient could, with the aid of a stenopeic apparatus, see as well as with the other eye. In this patient the iris was probably absorbed.

In Praun's patient, a wound six millimeters long was produced. After recovery the iris was absent, and the patient had 0.7 vision with a convex cylindrical lens.

Green's[4] (St. Louis) patient received a T-shaped penetrating wound of the cornea through which the iris was avulsed. The lens received a slight injury in its lower third; vision, 5/10. In a personal communication to the writer, Dr. Green states that in October, 1914, vision was 5/8.

Wintersteiner[6 7] has written extensively regarding his observations. In one patient with a subconjunctival rupture of the sclera the iris lay under the conjunctiva; this was confirmed by finding microscopically retinal pigment. The ciliary processes with radiating fibers of the zonula were observed. Ten minutes after the instillation of a one per cent eserin solution a distinct bulging and broadening of the ciliary processes was noticed, but the lens margin retained its narrowness, showing that the equatorial diameter of the lens was not decreased. Its distance from the ciliary processes was decreased accordingly. The action of atropin was indefinite. The field was not enlarged.

In another patient, whose eye was finally removed, Wintersteiner observed the bending backward of the ciliary processes, their apices coming in contact with the ora serrata. This observation adds substantial support to Fuchs'[13] theory in which he describes as a second factor the tearing free of the iris root by the backward pressure of the aqueous, following an impact on the anterior segment of the globe.

The above case histories of aniridia record either incised or perforated wounds of the cornea resulting from a direct force. True ruptures of the cornea, the result of indirect force, practically never occur. The usual tissue involved, however, in this class of injury is the sclera, and the injury is due to blunt instruments.

In all references the writer has been able to consult, in which the sclera has been ruptured with avulsion of the iris, there has also been loss of the lens or an injury to it.

Lagrange,[10] together with several other observers, has reported patients in whom both the lens and iris have escaped through the scleral rupture and lodged beneath the conjunctiva.

Mayou,[5] in his paper, calls attention to the fact that in certain cases traumatic aniridia may only be apparent, the iris being retracted into the angle of the anterior chamber by the organization of fibrous tissue on its surface. Complete retroflexion of the iris is referred to by Förster as a possible source of error in diagnosis.

Recovery with preservation of vision is more likely to occur when complete avulsion of the iris has taken place. If fragments are caught in the wound, a subsequent cyclitis is more likely to occur, or an ingrowth of epithelium may give rise to the formation of a fistula.

Several theories have been advanced in explanation of the more or less characteristic features of a scleral rupture. Julius Fejer[3] [19] refers to one, according to which the eyeball is driven with such force against the bony margin of the orbit that the latter lacerates the former, and the eyeball ruptures more easily in the place of least resistance, which is near the limbus.

Salzmann[11] states that the eye is an elastic wall with fluid contents. After any blunt insult to the sclera or cornea a depression results, and since fluid is scarcely compressible, the size of the tunica fibrosa must be increased. This adds to the tension at the same time, and thereby the eye contents tend to be expelled—as, e. g., the lens or iris. The bulb ruptures at its weakest point. When the blunt force dents in the cornea the aqueous is pushed back against the iris-lens diaphragm, which gives way easiest near the iris root, in a direction across the perilental space.

Arlt's hypothesis is that the distension of the eyeball is greatest in the direction opposite to that of the blow, and that the rupture always takes place at the apex of the distension.

The occurrence of traumatic aniridia may be accounted for by accepting Arlt's views. He states that following a contusion the periphery of the iris is unable to adapt itself to the suddenly enlarged circle of its insertion.

Fuchs[13] gives as a second factor the sudden flattening of the cornea, pushing the aqueous outward and backward. Thus the periphery of the iris, being the most yielding spot in the posterior wall of the anterior chamber, gives way.

A very interesting controversy has occurred between Wintersteiner[6 7] and Schäfer[12] relative to the cause of the severe hemorrhage occasioned by traumatic aniridia, and yet in the majority of instances the absence of excessive hemorrhage following iridectomy for glaucoma.

Schäfer contends that in iridectomy there is a compression wound made by the scissors, the vessels retract into the tissue, the intima curls up and the formation of a thrombus is thus favored. He also adds that there is a larger stump, and that the pressure of the lens forward, together with the increasd intraocular pressure, prevents undue hemorrhage; while in aniridia the vessel walls remain open, owing to their laceration. Chief of all reasons, however, he states, is the presence of a local vasomotor paralysis, causing vessel dilatation.

Wintersteiner agrees with Schäfer regarding the theory of a compression wound, but discredits the pressure of lens and increased intraocular tension, on the ground that in making an artificial pupil, when iridodialysis has occurred, the hemorrhage is severe, yet the pressure conditions within the globe are the same. He contends that the hemorrhage in aniridia is severe, due to the tearing away of the iris at its root opening the large arterioles and venous sinuses, thus lacerating the vessels lengthways. The iris veins are without valves. The intraocular pressure is suddenly reduced. The chief reason, however, he states, is the fact that always, in such injuries, Schlemm's canal is opened and the pouring out of that fluid prevents clotting.

In conclusion, the writer believes that the blunt instrument, acting by indirect force, detached the iris, which, immediately succeeding the rupturing of the sclera, was completely swept from the eyeball. Regarding the excessive hemorrhage, the writer accepts Wintersteiner's views.

Just why other structures were not disturbed is difficult to explain, except on the theory that the force applied was just sufficient to accomplish the above results. Why the satisfactory recovery was obtained is equally unexplainable, no unusual efforts having been inaugurated to save the eye, the writer firmly believing the condition hopeless.

The writer wishes to acknowledge his indebtedness to Drs.

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XII.

THE USE OF OPTOCHIN IN EXTERNAL EYE DISEASES, EXCLUDING PNEUMOCOCCIC INFECTIONS.*

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Optochin is a preparation put on the market by the Vereinigte Chinin Fabrik of Frankfort a/M. as a chemotherapeutic agent for those pneumococcic infections taking the form of serpens ulcus and conjunctivitis, and for disinfecting the conjunctival sac preparatory to operating. This drug is a derivative of quinin, and synthetically is hydroethyl cuprein, put up in a basic form or as a hydrochlorid. I personally have had my experience with the latter form, as I have not been able to obtain optochin basicum. There is no novelty in the use of this preparation, as many articles have appeared dealing with its efficacy in the treatment of corneal ulcers, quoting quite favorable results. But it is not within the scope of this report to dwell upon the original use of this agent, rather to relate my experiences, good and bad, in the treatment of other external diseases.

In the *Klinische Monatsblätter* of September, 1914, appeared an article from the Stanculeanu clinic in Bukarest, with the report of eight cases of gonorrheal ophthalmia treated with optochin, and so favorable were the results that that paper was really the incentive in attempting its use in various conditions. "It was found that with this treatment absolutely no irritative or intoxication symptoms were manifested, that the children nourished nicely and showed no constitutional changes. All the cases were clinically cured long before the gonococci disappeared from the smears, so that only a bacteriologic examination could give positive information. They believe that all ophthalmologists must agree that a maximum of fourteen days to cure the severest cases is a most wonderful performance. Corneal ulcers and infiltrations not only showed no progression, but even the advanced cases were markedly improved. Thus this drug is far superior to silver nitrate and has the practical value of not needing the services of a doctor for its administration."

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*Read at the Chicago meeting of the American Academy of Ophthalmology and Oto-Laryngology, October 5, 1915.

During the interval in which I was working up my cases an article[1] from the eye clinic of Prof. Grünert of Bremen upon the same subject appeared. The author divided his cases into: (1) pneumococcic conditions; (2) diseases of the tear sac; (3) cases in which photophobia was a marked symptom. His conclusions in the first group show that the earlier optochin is used so much better is the prognosis, and that the end results are superior than after the older method. Personally in bad corneal ulcers I prefer cauterization.

As a substitute for tear sac extirpation, irrigation with optochin will never succeed, but in slight infections or in acute varieties success frequently follows.

The chief advantage was found in those cases with marked photophobia or in scrofulous inflammations. It was astounding how rapidly conditions of long duration were overcome. Two of his cases of parenchymatous keratitis gave no results, and, as I shall show later in my case reports, I had exactly similar experience. The use is also contraindicated in lime burns. The action of optochin in these cases of photophobia is not due to its anesthetic quality, as maintained by Peterka, for cocain, which acts more vigorously and over a longer interval, does not show nearly the same effect.

Gebb of Greifswald investigated the germicidal action of optochin experimentally, and found that a two per cent solution kills pneumococci in a test tube at once, one per cent in five minutes, and a one-half per cent not at all. In drop dose experiments the germicidal value is not worth mentioning. In the eyes of rabbits a one per cent optochin proved much more effective than oxycyanid of mercury. We must, however, bear in mind that clinical and test tube experiments show wide variations, especially in ophthalmic medication. Years ago Roemer proved that eye medicaments acted not by direct germicidal effect but by the production of antigens and antibodies. We know that it takes a 1/1,000 bichlorid solution over ten minutes to kill staphylococci. Now, if a solution of this strength be instilled in the eye, how long would it take to become a multidilution, and how long would even a trace be discoverable in the conjunctival secretion? All our drugs, excepting those forming albuminates, work only by indirect action, and thus it must be with optochin; hence, the inhibition or destruction of cultures in a test tube matters little, providing the clinical end results are satisfactory.

I have treated the following cases with optochin, and shall give the clinical reports of all in brief, excepting the gonorrheal histories, upon which I desire to lay special emphasis as the most important part of my information: two cases of gonorrheal ophthalmia, two cases of interstitial keratitis, three cases of vernal catarrh, three cases of phlyctenular disease, three cases of trachoma with pannus and ulcer.

Case 1.—Dr. Z., aged thirty years, reported at my office September, 1914, having suffered since spring with terrible itching of the eyes and much clear stringy mucus. Had been treated by several colleagues with all recognized metallic astringent preparations, but no results. The tarsal conjunctiva was covered by a typical bluish haze, while the bulbar mucous membrane, especially on warm days, became highly congested. I ran through my list, but adrenalin and novocain alone brought relief. As the cold weather approached the condition improved, and it was not until May that I saw him professionally with the same symptoms. I advised radium, but it was refused, and as a last resort prescribed one per cent optochin two hourly. Imagine my surprise when, at the end of a week, the patient reported absolute comfort from the itching; and he has continued to use this preparation when necessary through the entire summer with perfect relief.

Case 2.—Mrs. M. M., aged forty-six years, had repeated attacks of itching and red eyes for the past five summers. Reported to me with the first warm days of April. Eyes are red and around the limbus are several indistinct nodules. I ordered one per cent optochin three times daily, and saw the patient weekly for a month, and finding that she had absolute relief, discharged her until further trouble.

These are two mild cases of vernal catarrh which responded to this new therapy, and I hope to try this preparation in every case of like nature.

Case 3.—Mary Mc., aged eleven years, was treated by me seven years ago for trachoma in the cicatricial stage. She now reports at the office with a thick pannus crassus covering the entire left cornea, marked epiphora and photophobia. I brushed with two per cent silver, but as she lived in Kentucky and could not come regularly for treatment, I ordered two per cent optochin three hourly. At the end of two weeks there was a tremendous improvement, and after six weeks the blood vessels on the cornea were scarcely perceptible, with a vision of 6/12.

Case 4.—H. D., aged forty years, at the General Hospital with a large leucoma adherens in the left eye, while the right eye had a marked entropion of the upper lid from a third stage trachoma with a central corneal ulcer surrounded by maculæ. Vision, 15/70. Optochin two per cent instilled three hourly, with relief from pain and gradual diminution of the ulcer. After ten days' treatment a Hotz operation corrected the distorted lid. The steady improvement noted before the operation continued until four weeks after admission the patient was discharged with an acuity of 15/24.

Case 5.—A colored man of thirty-five years, on our service at the hospital with ectropion and trachomatous pannus. The lids were corrected by the house surgeon and optochin two per cent used three hourly. He slowly improved until his vision rose from 1/10 to 3/10.

We find in these three cases of trachoma a marked improvement, all of them responding nicely. However, what proportion of benefit was derived from the lid plastic is a debatable point. My own reply is that betterment had already started before the operations were attempted, and the drug seems applicable to the cicatricial stage of trachoma even in stronger solution than I dared use, as the tissues are extremely resistant in these much handled victims.

Case 6.—Mrs. C. G. Interstitial keratitis from acquired lues; was treated for two months with optochin and showed absolutely no results, the vision remaining the same in both eyes. This, however, was a case of long standing and was practically stationary when the drug was ordered.

Case 7.—M. A., thirteen-year-old girl, on Cincinnati General Hospital service. Active inflammatory condition, both eyes, positive Wassermann, a typical congenital infection.

Optochin seemed to produce more congestion and was decidedly painful, so after several weeks we stopped this therapy.

The conclusions I must draw from cases 6 and 7 are that optochin is contraindicated in parenchymatous keratitis, especially since Stengele, the only other writer I can find who attempted its use, met with like results.

We next pass to the phlyctenular inflammations, with photophobia, lacrimation and other book symptoms. Of this variety I treated three, two of which, cases 8 and 9, had corneal involvement, and one (case 10) merely conjunctival phlyctenules. All the cases were in children and were treated with ten per cent yellow oxid at the office and one per cent optochin at home three times daily. They were all influenced most favorably, but sufficient time for recurrences has not elapsed. Again I must agree with Stengele in finding a most rapid disappearance of photophobia. Since recording these three cases I have treated two adults at the hospital with similar favorable results.

I now come to the most important but at the same time depressing part of my paper, in which I wish to fully describe two unfortunate terminations in gonorrheal ophthalmia.

Case 11.—H. was an infant seven days old when admitted to the hospital service. Mother and father both denied infection, and examination was negative. A practical nurse had assisted the doctor at confinement, and the Crede prophylaxis was used. Three days after delivery the doctor noted pus in the baby's eyes and a fully developed ophthalmia.

Upon admission large quantities of thick creamy pus oozed from between the tremendously swollen lids. A very marked chemosis was present. Corneæ were clear. Two slides contained numerous Gram negative diplococci.

The treatment of the Stanculeanu clinic was instituted—flushing with permanganat 1/10,000 hourly, followed by alternating one and two per cent optochin.

The following day, July 1st, secretion slightly less; July 3rd, irrigations changed to chlorin water (dram one to ounce six) half hourly, with the optochin hourly. There was a steady improvement, with occasional remissions; the chemosis almost disappeared and the eyes remained free from pus for two hour intervals. Baby opened eyes on the 7th and doing nicely. On the 9th I made a careful examination and found everything as it should be, and left on my summer vacation, much elated over the therapy.

The following notes, together with the other hospital reports, are from Dr. Merrick McCarthy, the efficient ophthalmic house surgeon, whom I desire to thank for his kindly assistance and general work.

The evening following my departure, Dr. McCarthy noticed a slight cloudiness on the lower sclerocorneal margin of both eyes, which seemed to be spreading upward, although there was little swelling and discharge. The optochin was stopped and two per cent nitrat of silver applications applied daily, with flushings of boric acid half hourly.

July 11th. Much pus and entire corneæ of both eyes opaque. No gonococci found at this time. Despite the united efforts of staff and houseman the case ulcerated and perforated ten days later.

I have given this case much careful thought, and although I did not see the corneal condition, must say that it does not seem to me to have been of gonorrheal origin for several reasons:

First—Corneæ are seldom involved when the disease is regressive, little pus and eyes open.

Second—Both eyes are not affected simultaneously.

Third—Within twelve hours of the onset both corneæ were completely destroyed.

The general condition of the child was reported poor. Could it have been a keratomalacia such as I saw years ago in the Vienna clinic, following a birth infection? I personally saw only a steady improvement in the case.

Case 12.—A white male, nineteen years old, contracted urethral gonorrhea fourteen days before admission. Nine days later the right eye became infected and was treated by a general practitioner until sent to the hospital by a consultant on July 2nd. The right eye cannot be opened because of the swelling. Much thick yellow pus, and upon separating the lids a blood stained chemosis is present. The cornea is completely opaque, denuded of epithelium; tension, minus; vision, qualitative. Left eye not involved. Treatment was permanganat flushings, followed by one and two per cent optochin solutions. Atropin one per cent four hourly. Protective dressing to left eye. Gonococci found both in smears and cultures.

July 3rd. No change.

July 4th. Eye irrigated half hourly; discharge still free.

July 5th. Irrigations changed to chlorin water.

July 6th. Secretion less. Cornea seems slightly clearer; chemosis less, but tissues are still beefy.

July 7th. Optochin one per cent two hourly. Condition better.

July 9th. The pus has almost stopped, requiring flushings only at from two to three hour intervals. Here I left this case, and as the treatment was changed by my successor, the remainder of the history has no bearing upon the question. Sufficient to say that the left eye was kept intact.

What conclusions can I draw from these two gonorrheal cases from which I expected so much when I left the city? My observations showed only the advantageous use of the optochin, but the subsequent history of the baby causes me to hesitate in my enthusiasm. That the drug itself is never harmful must be granted, after its use in thousands of eyes; but the brilliant results of Puscariu are wanting, although the symptoms diminished rapidly in both cases and I had no opportunity to study the terminal effect.

I have put forth honestly the results of these few cases, not to lay down any fixed rules for the use of ethylhydrocuprein, but only to make these few trials a beginning for reports from the other clinicians, so that positive or negative conclusions as to its worth may be fixed. Despite my one bad result in gonorrheal ophthalmia, I feel justified in attempting its use in similar cases, so sure am I that careful observation can prevent any untoward complications and that the blame cannot be attributed to optochin.

If repeated observations verify the Bukarest reports, we surely have a decidedly simpler and more efficacious therapy in Neisser infections.

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ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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Penetrating Injury to Eye From Broken Spectacle Glass.

Stephenson, Sydney (*Ophthalmoscope,* October, 1915), reports a case of perforating wound of the eye in a woman, from broken spectacle glass. The patient in stooping struck the right lens of her spectacles upon the newel of the staircase. Examination two and one-half hours later revealed a prolapse of the iris about the size of a very small pin head, midway between the center of the cornea and its outer edge, slightly below the transverse meridian. Lenticular opacity in lower and outer quadrant. Vision, 3/36. Tension, — 3. The eye made a good recovery under local treatment, and four months after accident was free from irritation. A small anterior synechia in lower outer quadrant of the cornea remained, and streaks of feathery opacity radiated from the wound into the substance of the lens. Vision, 3/36, and No. 20 Jaeger. Tension, normal.

The writer has seen but two other cases where eyes were injured by broken spectacle lenses, during twenty-five years' experience in hospital and private work. His experience coincides with that of Lauber, who found only five cases among one hundrd and fifty thousand ophthalmic patients.

W. R. P.

Eye Injuries Caused by Occupation—Their Prevention and First-Aid Treatment.

Collis, Edgar L. (*Ophthalmoscope,* October, 1915). Eye injuries caused by occupation may be grouped in classes which differ, not only in their origin, but also in prevention and treatment:

1. Injuries arising from direct traumatism, such as from flying fragments of stone or metal. Injuries in this group, since they occur at a definite moment of time, are legal "accidents."

2. Injuries due to the presence of foreign matter, often in the form of dust particles, injurious on account of its chemical composition. Such injuries may occur at a definite moment, due to a definite particle, or may be the result of prolonged exposure; and they occur from exposure to dust of pitch, lime, cement or to splashes of acid or alkalin fluids.

3. Injuries following upon exposure to intense heat and light. These injuries, which can seldom be considered legal accidents, require subdivision into (a) acute; e. g., conjunctivitis caused by exposure to the electric arc in the process of welding metals; and (b) chronic; e. g., posterior cortical cataract seen in glass workers exposed for years to heat and light from molten glass.

The percentage of all accidents due to eye injuries is slightly over five per cent, and in 1913 between seventeen and eighteen thousand eye injuries occurred among males employed in mines, quarries, factories and workshops. Granite workers show a special liability to eye injury, owing to the hardness of the stone and the use of pneumatic tools. Of seventeen hundred granite cutters employed in Aberdeen, statistics show that one out of every two requires medical assistance for eye injuries annually.

There can be little doubt that by suitable protection the majority of the injuries could be prevented. Goggles of various kinds are advised for protection against flying particles and intense heat and light. W. R. P.

Siderosis of the Eye, With Notes of Seven Cases.

Clegg, J. Gray (*Ophthalmoscope,* October, 1915), reports seven cases of siderosis from retention of intraocular foreign bodies.

Siderosis of the eye is not of very frequent occurrence. It is most commonly the result of the lengthened stay of a particle of iron or steel in an eye, but it may also appear after severe intraocular hemorrhage.

The writer's experience at Manchester has led him to believe that failure to remove an intraocular body does not necessarily indicate enucleation. If the sclera has been incised and a negative result obtained, the question as to removal of the eye is settled rather by the amount of damage to the globe. Copper or brass particles are most prone to set up a severe inflammation sooner or later, destroying the eye. On the other hand, iron or steel particles may be tolerated for years. The presence of such iron or steel particles in the conjunctiva, sclera or cornea may be tolerated with practically no siderosis. The iris may tolerate a chip well, as in a case of Bride's, in which a chip was lodged in the tissue of the iris for seven or more years, causing no change other than repeated attacks of iritis.

If a chip has penetrated the eye and is completely embedded in the sclera, no siderosis is likely to appear.

The crystalline lens is tolerant of a foreign body, and certainly iron or steel may remain in it for a long time without diffusion of metallic particles.

Siderosis may arise from iron or steel in the vitreous, retina, ciliary body and choroid.

Siderosis is a rare condition, as is evidenced by the fact that among 458,496 patients admitted to the Royal Eye Hospital during fifteen years ending 1913, only thirteen had been diagnosed as siderosis. This number is somewhat short of the actual total, as others were diagnosed after they had been admitted into the hospital.

The clinical appearance consists chiefly in a rusty brown discoloration of the iris, opaque lens which often presents a yellowish brown tinge; the characteristic marks, however, are the deeper brown opacities toward the periphery in the subcortical zone. Such an eye may be quiet, or may show signs of uveitis in any degree of severity.

The particulars in the cases reported are given. The last case is particularly interesting in that a small foreign body entered the periphery of each cornea down and out, without wounding the lens, each eye revealing a definite scar at the back. Siderosis appeared in each. In the left eye such violent inflammatory changes took place about eighteen months after the entrance of the foreign body that the eye had to be removed. The second eye has tolerated the presence of a chip of iron for nineteen years, and in it the amount of siderosis is not great; the difference probably being that in the right eye the fragment is entirely embedded in the sclera, whereas in the left it probably projected through the choroid into the vitreous.

It is to be regretted that the writer was unable to trace his cases in order to determine whether the staining of the tissues clears after removal of the foreign body. W. R. P.

Industrial Accidents and Diseases.

SHUFFLEBOTHAM, FRANK (*Ophthalmoscope,* October, 1915). The paper deals with the accidents and diseases occurring in the seven principal industries of England—mines, quarries, railways, factories, harbors and docks, constructional work and shipping.

In the last five years no fewer than 18,219 men and women have lost their lives, and over two million have sustained injuries in the course of their employment. With regard to the nonfatal cases, no account is taken of those accidents where the injury is so slight as only to incapacitate the worker for seven days or under; but of the two million people who have sustained injuries, only eight and one-half per cent were kept away from work between one and two weeks, while five per cent were incapacitated for from one to three months. The average number of work people who sustain serious injuries which incapacitate them from work for more than a year, including permanent and total disabilities, amounts to about twelve thousand a year.

In spite of all legislative attempts to lessen the predisposition to accidents, a large proportion of working people are seriously injured every year, and the number of accidents is on the increase. In 1909, 332,612 were injured, while in 1913, 476,920 were injured.

Direct injuries of the eyes in workmen is not referred to, but the writer emphasizes the importance of the examination of the eyes in almost every serious case of industrial accident. This is also true in detecting concurrent disease which is entirely independent of the injuries which have been produced by accidents, although in some cases the disease may be aggravated by the injury. By this means one is able to detect the effects of syphilis, diabetes, gout, and Bright's disease; in many cases it is possible to diagnose arteriosclerosis, which may be more obvious in the retinal arteries than even in the aorta or the large arteries of the body. The diagnosis of locomotor ataxia, or the early stages of general paralysis of the insane, may be made for the first time after a complete examination of the eye, and the symptoms of which the man may complain in any given case may be due to the disease and not in any way to the accident.

Attention is called to the frequency of pneumococcal ulcer of the cornea among coal miners, due to pneumococcal infection of the lacrimal sac.

Industrial diseases as a whole are on the decline. Of the twenty-six diseases or groups of diseases which form the schedule of the Workmen's Compensation Act, fifteen may be of interest to the eye specialist.

Lead poisoning may be first discovered by examination of the eyes. In the chemical industries eye affections may arise from poisoning by the nitrobenzine products, by carbon bisulphid, by nickel carbonyl, as well as by nitrous fumes; and in processes in which salts of chromium are used, one may find ulceration of the cornea, conjunctivitis, inflammation and sometimes ulceration of the eyelids; while pitch and tarry compounds are known to produce epitheliomatous ulceration of the corneal surface of the eye.

But the most frequent of all industrial diseases is miners' nystagmus. During the year 1913, 2,402 new cases were certified to the home office as being productive of incapacity for work, in addition to which 2,140 cases had continued from the previous year, making a total of 4,551; and apart from the men suffering from this disease to such an extent that they are unable to work, there are many thousands of coal miners who are working with the disease, but whose earning capacity and output of work are very much reduced in every case.

The fact that a large proportion of cases of miners' nystagmus exhibit refractive errors is offered as a suggestion that men with refractive errors should be prevented from working in the mines. W. R. P.

A Clinical Study of Fifty-five Cases of Intraocular Retention of Foreign Bodies, With Results Two Years Afterwards. (Continued.)

BROWNLIE, W. BARRIE (*Ophthalmoscope,* October, 1915). Certain pathologic appearances in eyes from which a foreign body has been removed indicate the advisability of an early enucleation. Such conditions of the eye appear between the second or third day and the end of the third or fourth week.

1. A muddy, injected iris, with perhaps exudate in the pupillary area, and maybe hypopyon. Keratitis punctata is usually not present until at a later stage. These features indicate a plastic iridocyclitis, and enucleation is advised because they are apt to end in a soft and shrunken eyeball, especially liable to be followed by sympathetic ophthalmitis.

2. By oblique illumination a definite yellow reflex is obtained from the vitreous. This is usually accompanied by the foregoing signs of iridocyclitis, and indicates a plastic or suppurative uveitis.

3. An eye at first seems to be improving, but on closer inspection the iris looks somewhat atrophic, the vision being practically nil, and, on feeling the tension, which tends to be below normal, the patient starts back when pressure is made on the ciliary region. In these cases there are often sharp attacks of pain in and around the eye, especially at night.

Enucleation is preferred to evisceration. If an eye has useful vision, an effort is made to preserve it before advising enucleation. Subconjunctival injections of bicyanid of mercury plus the usual local treatment are used.

After three or four weeks, if it has been decided not to enucleate, the possibility of sympathetic ophthalmitis must be taken into account. As a matter of routine, an examination of the eyes should be made, looking especially for any signs of iridocyclitis, optic disc or retinal vessel congestion, contraction of the visual field, spindle-shaped enlargement of the blind spot, loss of visual acuity, and paresis of accommodation, due to early impairment of the ciliary muscle.

A résumé of Browning's work with the blood picture of sympathetic ophthalmitis is given. He puts average blood count in sympathetic ophthalmia as follows:

	Sympathetic. Per Cent.	Normal. Per Cent.
Polymorphs	54	60 to 70
Lymphocytes	28	20 to 30
Large mononuclears	16	2 to 5
Eosinophiles	2	2 to 4
Mast cells	....	— to .1

The blood count has been found to show marked changes at a time when there was still no other evidence pointing to the probable onset of sympathetic ophthalmitis. Because of the striking similarity of the blood count to the blood count in certain protozoal diseases, salvarsan has been administered in sympathetic ophthalmia at Moorfields Hospital with more or less success.

There is another means of service in the diagnosis of sympathetic ophthalmitis following enucleation of the injured eye, namely, by the histologic examination of the injured eye.

These changes were first described by Fuchs as "sympathetic infiltration." The cells taking part in the infiltration are the same as in the giant celled tubercle system—lymphocytes, endothelioid cells, and giant cells—but made up together in irregular strands and tracts, rather than disposed with any regularity, as in the tubercle system. The distribution is more or less characteristic—in the posterior layers of the iris, in the other part of the inner zone of the ciliary body, and in the outer layers of the choroid. Fibroplastic exudate in the vitreous is the exception.

Two cases of sympathetic ophthalmia are included in the author's series, one of which obtained a vision of 6/6 following large doses of salicylats plus local treatment. The second case resulted in the reduction of vision of the remaining eye to hand movements. (To be continued.) W. R. P.

Nystagmus Cases and Electric Lamps.

Coulter, R. J. (*Ophthalmoscope,* November, 1915), reports the contents of a letter from the manager of a group of Welsh collieries employing twenty-six hundred men. From the experience gained in dealing with cases of nystagmus, the following conclusions were arrived at:

First, that insufficient light causes nystagmus.

Second, that the introduction of electric lamps has enabled scores of workmen to continue working underground.

Third, that the use of an electric lamp is a good preventive of nystagmus. W. R. P.

Some Ocular Effects of Plumbism.

McMurray, S. (*Ophthalmoscope,* November, 1915), gives the results obtained from the examination of the eyes of twenty-two cases of plumbism. He was able to follow up sixteen of the cases. As a rule the patient complains of headache, and often of sudden mistiness and the appearance of cobwebs before the sight. All showed at one time or another contraction of the visual field of from five to twenty-five degrees. More remarkable than the contraction was the fact that it varied in every case, apparently having an intimate connection with the acuity of vision and with the degree of headache.

Three showed a central scotoma for red and blue.

Seven showed a relative scotoma for blue.

Ten showed a contraction of the field for blue, and of these, three showed an actual interlacing of red and blue.

Three had paresis of the external rectus, and nine had deficiency of accommodation.

While there was no gross lesion of the fundus present, as a rule there was considerable variation in the appearance of the retina, especially immediately after severe headache or sickness.

At one time the choroidal vessels may be seen quite clearly, the edge of the disc and the lines of the retinal vessels may be seen distinctly, then, perhaps on the next day, the choroidal vessels may disappear, the retina seem swollen and hazy, and the vessels become indistinct. As a rule the extent of the contraction of the field is in proportion to the edema of the retina. A case is reported in detail as showing very well the different phases—apparently dependent entirely upon vascular changes and not associated with neuritis.

A man, aged forty-two years, a very moderate smoker, complained of attacks of colic followed by "foggy" vision for a few days each time. Vision, w. c. 6/12 in each eye. Central scotoma for blue, red and green. Form field contracted ten degrees in each eye. Ten days later, following an attack, vision was reduced to 6/20, and the fields contracted to thirty degrees. Nasally and below there was a sector-like defect reaching to the fixation point. The central scotomata were, if anything, slightly enlarged. There was no gross lesion of the fundus, but there was distinct retinal irritability, and the retina appeared hazy and edematous. The choroidal vessels, which had been clearly seen, were now imperceptible. The disc edges were blurred and indefinite. Three days later the vision had improved to 6/12, and the fields were contracted only ten degrees, the sector scotoma disappeared. Similar conditions were found present each time after three subsequent attacks. The blood pressure was usually increased about twenty millimeters after the attacks.

The writer finds that so long as the patient continues work in the lead process the symptoms persist, no matter how vigorous the treatment, but when the occupation has been changed to a nonlead one, and the blood pressure reduced, there is a gradual disappearance of all symptoms. W. R. P.

Prognosis in Coal Miners' Nystagmus.

NORMAN, ALFRED C. (*Ophthalmoscope,* November, 1915). Nystagmus is divided into two classes: infantile nystagmus, due to imperfect development of the function of central fixation, and nystagmus developing later in life, due to perverted central fixation.

In the case of the coal miner at work there is a combination of conditions tending to throw out of gear the mechanism of central fixation. An important factor is the constant strain to which certain groups of ocular muscles, generally the elevators, are subjected as a result of the cramped position the men assume when under ground. Defective illumination of the coal mine also plays an important part in the etiology of nystagmus.

At best, the sensitive stimuli are very weak, and in view of the fact that the fovea is less sensitive to minimal stimuli of white light than the rest of the macula, it is more than probable that the miner departs from central fixation in order to bring his images on the perifoveal zone. This procedure, carried out day after day, tends to disorder the delicate mechanism of central fixation.

There is also the possibility that the presence of gas (methane) in the pit may assist in unbalancing the delicate coordination necessary for central fixation by poisoning the cerebral centers and tracts. In addition to these factors are the personal factors—visual defects, such as corneal opacities, choroiditis, simple glaucoma, toxic amblyopia, and especially errors of refraction. The writer found refractive errors in ninety per cent of three hundred consecutive cases examined.

The ultimate prognosis of miners' nystagmus is distinctly good. It never leads to ocular disease or to blindness, and as soon as the patient is removed from the influence of certain causal factors, it tends to disappear without further treatment.

A large proportion of miners suffer from nystagmus without being aware of the fact—that is to say, the malady tends to become chronic, and in that stage gives rise to no troublesome subjective symptoms.

An outstanding feature of miners' nystagmus is, of course, its tendency to relapse after an apparent cure has been obtained.

The severity of a given case, generally speaking, is in inveres ratio to the angle through which the patient must elevate his eyes above the horizontal in order to bring on the oscillations.

With regard to the removal of the causal factors, if the patient refrain from working in the pit, he will remove two important factors, but his recovery will be greatly hastened if attention be paid to the personal factor as well. If, however, the personal factor cannot be eliminated or improved by the prescription of suitable glasses or treatment, the prognosis is much less satisfactory.

Many cases gradually relapse into the chronic form without further trouble. Others have a second, or even a third, acute attack before reaching the chronic stage, each attack, as a rule, giving rise to less inconvenience than the previous one and bringing the patient appreciably nearer the chronic stage.

A man is allowed to return to work, preferably work under different conditions, one month after the time when thirty minutes in a dark room elicits no oscillations with the eyes, brought to the extreme point of elevation and kept there for thirty seconds. W. R. P.

Glass Workers' Cataract.

Robinson, Wm. (*Ophthalmoscope,* November, 1915). The frequency with which hard cataract was noticed in bottle-makers who came to the Sunderland Eye Infirmary induced the writer to make an inquiry into this subject, the results of which are recorded in two previous papers and the present one.

The nature of the work of glass workers is described, as cataract has been found more frequently in those whose work requires them to look into the intense light (about 540 lux) and heat (about 2500° F.).

About four hundred men are employed in the three factories in the Sunderland district, among whom there are one hundred and thirty "finishers," one hundred and thirty "blowers" and about one hundred and twenty "gatherers," many of them boys. Of these, forty were found to have cataract, although there may have been more among the men at work, many of whom refused examination. Three cases of cataract were in "gatherers" and thirty-seven in "finishers." These figures prove the great frequency of cataract in bottle makers, especially bottle finishers, and are unparalleled in any other trade.

Two-thirds of these cases began to suffer from cataract by the age of fifty years, and in fourteen cases disablement from work was brought about by the age of fifty-five years. In sixteen cases in which the data was obtainable it appears that the time between the sight beginning to fail and the occurrence of disablement from cataract varies from some months up to ten years, the average being about three years. Both eyes are almost always affected; and the disease often begins about the same time in both lenses, although there may be a difference of some years between them in this respect.

One hundred and fourteen members of the Glass Bottle-makers of the Yorkshire United Protection Society were superannuated during the last nine years, all of whom were over fifty years of age and unable to work. Thirty-seven, or 32.4 per cent, had cataract, and all but one of these were incapacitated for work through the eye condition. No other class of disabled workmen show such an unwonted prevalence of cataract. The average age of disablement was 57.3 years.

A perusal of the details of the author's forty cases shows that in sixteen cases the disease was seen in its early stages, and in thirteen of these it was found that it was posterior cortical in form, and in only three was it beginning in one of the ordinary senile forms as peripheral radial sectors.

When both lenses in a patient were seen in an early stage of the disease the form of the cataract was identical in both.

The opacity first appears at the posterior pole of the lens, immediately under the posterior capsule, and is often irregularly disc shaped. By oblique illumination it is distinctly brass colored. The outline of the disc-like part is well defined, but the opacity is less dense and shades off toward the equator. As the haziness spreads, it at first clings closely to the posterior capsule, so that it is saucer shaped in the earlier stages of the disease, the concavity of the posterior capsule of the lens being easily seen by oblique illumination. By direct examination with a plus 10 D. lens the central disc is sometimes seen to be not completely opaque, the opacity often presenting an irregular network appearance within an irregular circle, and the surrounding less dense opacity is often like a cobweb. From the posterior pole the cloudiness and opacity gradually spread to the rest of the cortex, and when the cataract is ripe the lens has a pearly hue.

The writer believes the cataract to be a primary one.

Dr. T. M. Legge examined the lenses of workmen in five factories—five hundred and thirteen persons exposed to furnace glare in glassworks, and for comparison two hundred and seventy-eight persons not so exposed. He found that all classes of glass furnace workers appeared to suffer, and that in them between thirty and forty years of age opacities of one kind or another in the lens were about five times, between forty-one and fifty, about twice, and at fifty-one years of age and over, more than three times as frequent as in those engaged in other work. The difference in the character of the changes observed was very striking, and of unmistakable significance. Thus, of the control persons examined, none had sought treatment for cataract, and in not more than three were the opacities such as to impair sight. Among the glass workers, in addition to six, in whom a single extraction for cataract has been performed, and in one a double extraction, there were at least twenty-five others in whom the sight of one or other of the eyes was seriously impaired. Typical central posterior cortical change of varying degree was noted in fifty-six lenses of the five hundred and thirteen glass workers, and in two of the two hundred and seventy-eight control persons examined.

Etiology.—From the facts already stated, it is quite certain that glass workers' cataract is caused by the exposure of the eyes of the workmen over a period of years to the radiations from the highly incandescent molten glass. Hence, the frequency of cataract in glass workers is in proportion to

1. The heat from the glass, which varies in different factories and in different classes of work.
2. The degree of exposure to which the eyes of the different classes of workmen are exposed to the glare; and
3. The length of time, each day, and the number of years, during which the various grades of workmen look into the tanks.

Therefore, in heavy glass bottle works the "bottle finishers" suffer by far the oftenest; next comes the "gatherer," who is succeeded by the "blower" and the "founder"; whilst the rest of the employes are not affected at all. The light flint bottle makers and pressed glass workers are not affected with cataract nearly so often as the heavy bottle makers. Iron workers and blacksmiths, whose eyes are also exposed to great heat, suffer from cataract in proportion to the degree of heat and length of exposure of the eyes at their trades.

The heat rays (infrared) are taken to be the cause of the cataract. The conclusion is reached rather by elimination of X-rays, ultraviolet rays and luminous rays as causative factors.

In the matter of prevention, dark colored spectacles are recommended until the alteration of the apparatus is such as not to expose the eyes of the men to the glowing sea of glass. Crooke's glasses "A" and "B" cut off one-third of the heat and nearly all of the ultraviolet rays, but are costly and not suitable for bottle makers. W. R. P.

"The Chevalier Taylor."

Coats, George (*The Royal London Ophthalmic Hospital Reports,* Vol. XX, part 1). This is an interesting historic article about a traveling ophthalmic quack of the early eighteenth century, who used all the methods of the charlatan, but also possessed mental endowments far above the average of his type, and showed considerable acquaintance with the contemporary state of ophthalmic knowledge. The sketch gives a history of his life and his methods, together with his relations with the medical profession and the opinion held of him by lay contemporaries; also a brief abstract of some of his writings, showing his views of the physiology of vision, cataract, squint, iritis, sympathetic ophthalmitis and other matters. W. E. B.

Pedigrees of Color Blindness.

Nettleship, E. Arranged by C. H. Usher (*The Royal London Ophthalmic Hospital Reports,* Vol. XX, part 1). This consists of three pedigrees:

1. A pedigree of color blindness, including color blind females. The interest of this pedigree is principally with regard to the inheritance of color blindness in females, and as to whether it is essential for the occurrence of color blindness in a female that the father be color blind and the mother capable of transmitting color blindness.
2. A pedigree of color blindness which shows seven color blind males, one a twin, in four sibships of two consecutive generations. All are descended from parents who, as far as is known, had normal color vision, and there is nothing to indicate that the inheritance of color blindness was not according to rule in any of the cases. Amongst the members with normal color vision occur congenital deformity, hare lip, and insanity.
3. An extension of a pedigree of color blindness that was published by Pliny Earle in 1845. W. E. B.

The Intraocular Tension, With Especial Reference to Its Variations in General and Local Vascular Disease.

Moore, R. Foster (*The Royal London Ophthalmic Hospital Reports,* Vol. XX, part 1). These notes are based upon observations of one hundred and eighty-four patients, a majority of whom have been suffering from some local disease of the retinal vessels associated with general arteriosclerosis; some have been the subject of a general disease without local disease in the eye, and some have been without discoverable disease. His conclusions are as follows:

1. Schiötz's tonometer is a thoroughly satisfactory instrument, and in its use holocain has no advantage over cocain.

2. Reasonable normal limits for the intraocular tension are from fifteen and one-half millimeters to twenty-five millimeters.

3. No parallelism exists between the variations in intraocular tension and the general blood pressure.

4. Patients whose general blood pressure is greater than two hundred and twenty millimeters have an intraocular tension which is only one millimeter higher than those whose blood pressure is less than one hundred and sixty millimeters; in other words, the subjects of arteriosclerosis with a very high blood pressure show no sensible increase in the intraocular tension.

5. The general blood pressure of patients who have a high intraocular tension from glaucoma is little, if at all, raised above the normal.

6. The intraocular tension can roughly be halved by the reduction of the local blood pressure in the vessels of the eye, and this is also true of glaucomatous tension.

7. The pulse wave is almost invariably transmitted to the tonometer lever, the amplitude of its movements varying inversely as the height of the general blood pressure.

8. In a few cases of high general blood pressure no pulse movement is seen.

9. In some cases of retinal arteriosclerosis with a high general blood pressure, this high pressure is so damped down by thickening and rigidity of the vessel walls, or by subendothelial proliferation, that the pressure in the retinal vessels is not raised, and may be instead below the normal. In this case thrombosis of the retinal arteries is likely to occur.

10. General arteriosclerosis is not a causative factor in simple primary glaucoma, and an attempt to reduce the general blood pressure in such cases is not likely to improve the condition of an eye in which the local blood pressure may already be below the normal.

11. Homatropin produces a slight increase of the intraocular tension in most cases of arteriosclerosis, but in no case of the present series was it thereby raised above the normal. The same is true of tributary venous thrombosis.

12. In cases of thrombosis of the central retinal vein, homa-

tropin often produces a considerable rise in the intraocular tension, and this not only in the affected, but also in the unaffected eye. W. E. B.

The Admission of Men With Glasses Into the Army.

Bradburne, A. A. (*British Medical Journal*, May 22, 1915), discusses in a very interesting way the question as to whether men wearing glasses should be admitted into the army, and divides the question into two general heads. First, the nature of the defect. Second, the type of recruit. Under the first heading he remarks that when the defect is of such a nature that without glasses the recruit is practically helpless, the great majority would be considered unfit for military service. When one eye only is seriously affected, and the other possesses fairly good uncorrected vision, it might be possible to admit the recruit if the error in the better eye be but a slight one. When the defect is such that the glasses make fairly good sight in both eyes into absolutely normal vision with one or both, the question of loss or breakage would form only a slight hindrance to his employment in any branch of the service behind the advanced lines. Under the heading, "Type of Recruit," comes the consideration of previous experience in the use of glasses, the particular branch of the service in which the recruit wishes to serve, and the general physique and intelligence of the recruit. The author remarks that a great deal could be said as to the wisdom of giving the matter a practical trial. E. S. T.

General Anesthesia for Eye Operations.

Butler, T. Harrison (*British Medical Journal*, April 3, 1915), discusses those cases which require a general anesthesia, and divides them roughly into those in which the operation is of such a nature that pain cannot be adequately abolished by a local analgesic; when, owing to tender age or diseased mentality, the patient does not possess the necessary self-control; and, finally, when the physical effect of the operation is liable to affect the patient adversely. The author's ideas are in accordance with those of most surgeons on these general questions. He points out that in certain plastic operations, extensive infiltration with local anesthetics diminishes the vitality of the flaps. Regarding the operation for cataract, he says: "It is exceedingly difficult, and even dangerous, to remove a cataract under general anesthesia, but if the patient possess no self-control, extraction under cocain is still more dangerous, for extensive loss of vitreous is almost certain to occur." Regarding the choice of anesthetic used, he briefly mentions the reasons for considering chloroform to be more dangerous than ether, and says that he has fully determined never to employ chloroform, either alone or with ether. The disadvantages of ether in general surgery do not always apply in eye operations, as the period of time is so much shorter and the excessive secretion of mucus is apt to occur in the later stages. The use of nitrous oxid gas during the period of induction completely overcomes certain objections connected with its administration. E. S. T.

A Case of Rotatory Nystagmus With Recovery Under Optical Treatment.

Barrie, T. Stewart (*British Medical Journal,* September 25, 1915). The patient was a girl, aged seven years, with concomitant rotatory nystagmus, involving both eyes equally, and alleged to have existed from birth. The visual acuity of each eye was 5/36. Glasses were prescribed as follows:

Right, + 1.50, ax. 80°. Left, + .75 ○ + 1.50, ax. 90°.

After wearing these for about a year it was found that the nystagmus "had apparently completely disappeared." Ophthalmoscopic examination showed complete absence of the oscillation in the right eye, with slight lateral movements in the left. The visual acuity of the right eye had risen to 5/18 +. The left remained unchanged. E. S. T.

Some Unusual Changes in the Visual Fields, the Result of Vascular Lesions in the Brain and Optic Nerves.

Posey, William Campbell (*Jour. Amer. Med. Assn.,* May 8, 1915), reports seven cases of various defects in the visual field and discusses their causation. A number of cases in the literature are cited, and he remarks that "there is ample evidence in the literature that migraine may be the exciting cause of organic brain disease, and that an area of softening of the brain may follow, which may manifest itself by a permanent paralysis, aphasia or hemianopsia. While such lesions usually occur in individuals who are predisposed in consequence of disease of the walls of the blood vessels, it would seem that in certain cases the vascular lesion may occur in young persons and even in some adults with healthy vessels. Caution, however, must be observed in ascribing even an exciting rôle to migraine in cases of organic brain disease, as it is not unlikely that independent disease of the blood vessels is responsible for the resultant symptoms, and the migraine merely coincident." E. S. T.

Blastomycosis of the Eyelids, With Report of Cases.

JACKSON, EDWARD (*Jour. Amer. Med. Assn.*, July 3, 1915). Two cases of this rare disease are reported. One, a man, sixty-eight years old, noticed, in 1911, a small nodule on the right cheek, which became steadily progressive. In March, 1912, the condition had increased so that patches of scar tissue occupied the forehead, cheek, and nose, while the upper lid was drawn away from the eyeball, exposing the cornea. Examination of the pus from the active lesions showed numerous budding organisms, such as characterize blastomycosis. He died later from kidney trouble, without presenting any evidence of systemic involvement.

The second case was a woman, thirty-nine years of age. In April, 1914, she noticed a swelling on the left upper lid, which was thought a stye. It gradually extended, and about May 1st a spot appeared on the lower lid near the nose. The growth was removed finally by complete excision. Various openings were made in the upper lid and the lid was thoroughly curetted. An examination showed the blastomycetes. November 24th a four per cent solution of silver nitrate was applied to the whole surface of each of the ulcers and potassium iodid was given, ten grains three times a day; the dose to be increased each day. In three weeks the lesions had healed completely. The author discusses the history and etiology of the disease, and thinks that the administration of potassium iodid in increasing doses is the most important element in the treatment. Curetting the lesions, or application of nitrate of silver, or similar solutions, may bring about conditions more favorable to healing, but the iodid is the essential agent. E. S. T.

Reaction of the Pupil, Strongly Suggestive of Arteriosclerosis With Increased Blood Pressure.

Wiener, Meyer, and Wolfner, Henry L. (*Jour. Amer. Med. Assn.*, July 17, 1915), have for six years observed a condition of the pupil which seemed always to be associated with patients registering a high blood pressure. The pupil is found to be larger than the average normal pupil, with a usual minimum size of four and a half to five millimeters in width. It contracts promptly to light stimulus, but immediately returns to the original size; and there remains, without the light stimulus having been changed. While it is not claimed that this reaction is pathognomonic, its association with arteriosclerosis with high blood pressure is so nearly constant as to make of it a sign that is at least strongly suggestive, and, therefore, of undoubted clinical value. A few selected cases are reported "from several hundred observations." The various features of other types of pupil are mentioned, and references are made to the literature on the subject. E. S. T.

Some Facts Concerning the Blind.

Allport, Frank (*Jour. Amer. Med. Assn.*, September 4, 1915), condenses some interesting facts from the 1910 census. The total blind population of the United States is 57,272. There are sixty-two blind persons in every hundred thousand of the population. Egypt has more blind persons proportionately than any other country in the world, having 1,325 to every hundred thousand. The statistics of blindness in the different states is given, as well as a number of other interesting figures, which it is impossible to tabulate in the ordinary limits of an abstract. E. S. T.

Birdshot Removed From the Vitreous Through the Pupil.

Pischel, Kaspar (*Jour. Amer. Med. Assn.*, October 9, 1915). The case was a boy, twelve years old, who had a birdshot, No. 9, pass through the cornea, lens, and lodge in the vitreous. Two months later he presented himself with the history that while wrestling with another boy he bumped his head and immediately felt a sharp pain in the left eye. Examination showed that the jarring had caused the shot to pass through the pupil into the anterior chamber. The author suggests in such cases the removal of the cataract, and then endeavoring to bring the shot through the pupil by "stooping exercises" might be a judicious mode of treatment.

E. S. T.

Some Aspects of Ophthalmia Neonatorum.

DERBY, GEORGE S. (*Jour. Amer. Med. Assn.*, October 16, 1915). This paper is based on a series of one hundred and forty-nine cases in the contagion wards of the Massachusetts Charitable Eye and Ear Infirmary. A number of questions are discussed. Hospital treatment rather than home treatment is in the vast majority of cases desirable. Six cases of the series died in the hospital. Two of these were premature. One died of meningitis, one of pneumonia, and two of hemorrhagic disease of the newborn. The author lays some stress upon the importance of proper feeding and tactful handling in the conduct of the case, so as not to interfere with the general nutrition. While the disease as a rule is bilateral, it may at times remain confined to one eye.

In the author's series of one hundred and forty-nine cases, seventy-seven were definitely due to the gonococcus. Of these, eighteen were monocular and remained so, a percentage of 23.4. It is probable that over one-half of the monocular cases in these series were secondary and not acquired at birth. In the study of the bacteriology of the disease, smears alone are not satisfactory, and steps should be taken to separate the gonococcus from the other Gram negative, biscuit-shaped diplococci, the most important of which group, from our standpoint, is the micrococcus catarrhalis. In fifty-six cases of the present series no organisms whatever were found in the smears. This high percentage is undoubtedly due to the fact that the patient entered the hospital at a comparatively late date—the average age on admission being slightly over twelve days, and in almost all of them some sort of treatment has been carried on and the organisms have largely disappeared.

The difference in severity between ophthalmia neonatorum and the adult type of infection is probably due to a certain degree of immunity transmitted by the mother to her offspring. In a certain number of cases the complement fixation reaction of the blood was tried. The sociologic aspects of the disease are discussed, as well as the importance of fixing the responsibility of corneal infection on those who may have for one reason or another delayed securing proper treatment. With regard to the local treatment, the author remarks that there is nothing to be added to what has been said many times over, and indeed no advance in this direction is to be expected until some specific drug or serum is discovered. E. S. T.

Hospital Internships in Ophthalmology.

Ellett, E. C. (*Jour. Amer. Med. Assn.,* October 16, 1915). This paper, being the chairman's address to the Section on Ophthalmology, contains a résumé of the work of the section, and a very interesting presentation of the general features of the intern's work. The author notes briefly the valuable opportunity presented by most hospitals, but the lack of systematic instruction and of proper supervision to make sure that the intern takes full advantage of his opportunities.

E. S. T.

Projectile Wounds of the Head—Experiences During Recent Service in Austria, With Particular Reference to Wounds of the Eyes.

Mills, Lloyd (*Jour. Amer. Med. Assn.,* October 23, 1915). Material for this paper is drawn from over three hundred cases in wards of the Vienna General Hospital. The author was further able to observe and assist in the surgery of over eight hundred other wounded. Facial wounds in the present war are very common. Infection of the sinuses is the rule when they are perforated. The importance of these frontal wounds to the eye surgeon lies in the comparative frequency of the accompanying fracture of the orbital plate. The cases are divided roughly as follows:

First, the most frequent type of bullet wound was that in which the anteroexternal wall of the orbit was cleanly shot away, the bulb always being ruptured.

Second, in many cases in which bullets struck or perforated the orbital cone, without touching the globe, the globe was shattered or injured by indirect violence.

Third, probably shrapnel and other shell explosions are the most common cause of unilateral blindness, and lead most frequently to enucleation, from direct perforation of and lodgment in the bulb, with or without infection, or from the frequency with which malignant serpent ulcers follow the not uncommon corneal abrasion.

Fourth, the author's cases of war psychoses, among which hysteric amaurosis is included, were all the result of a shell of some sort bursting unexpectedly in their neighborhood.

Fifth, about a sixth of the eye cases were those in which the strain of hard campaigning or insufficient food, and with exposure to weather and to filth conditions, had produced the same ocular diseases which might be expected to follow similar strain or exposure in civil life. A number of cases are reported in detail. E. S. T.

Carious Teeth as a Factor in Ocular Disease.

IBERSHOFF, A. E. (*The Journal of Ophthalmology and Oto-Laryngology*, May, 1915). Practically all vegetable and mineral poisons having a baneful influence upon the eye attack the optic nerve and retina, while endogenous and bacterial toxins affect primarily the uveal tract. Broadly speaking, the first named toxic agents might be termed inorganic, and the latter group may be called organic.

Affections of the vision incident to disease of the uveal tract suggest the presence of a metabolic toxin of albuminous origin, either endogenous, enterogenous or focal.

Three cases are cited to illustrate the author's contention that dental caries is an important factor in the cause of uveitis.

Case 1.—Left eye. Vision, 20/120; field, normal; large vitreous opacities, which precluded detailed view of the fundus. The nose and sinuses were normal, but the "mouth was in a filthy condition," showing leucoplakia buccalis, and the teeth were in all stages of decay. The patient had the bad teeth extracted, the small cavities repaired and the teeth thoroughly cleaned. During this time she was using dionin five per cent and taking potassium iodid. Thirty days later the mouth was in much better shape and the vision normal. The ophthalmoscope revealed no evidence of vitreous opacities or cloudiness.

Case 2.—Patient had had until recently a mouth full of "foul aching stumps and abscessed roots." The right eye was closed from an acute blenorrhea of the lacrimal sac. The ophthalmoscopic examination revealed large floating opacities which completely obscured the fundus. "There were also punctate deposits on the posterior lens capsule and Descemet's membrane in both eyes, more especially in the right." Vision was 20/200 in each eye. Surgical treatment of the lacrimal sac and the dental troubles, and the administration of calomel and potassium iodid for one month brought the vision in the right eye up to 20/100. Correction brought this vision up to 20/50. Two weeks later there was further clearing of the media and the vision with correction was 20/40. The patient is still under treatment.

Case 3.—Vision, right eye: counts fingers at ten inches only in inferior temporal quadrant. Pupil sluggish, numerous punctate deposits on Descemet's membrane, vitreous so turbid as to almost obscure fundus. In left eye vision was 20/40, and could be improved to almost normal. Several large stationary vitreous opacities and some stippling on the posterior corneal surface. The patient had four molar root abscesses. These teeth were extracted and the abscesses cured. Two weeks later her eyes felt much better. Vision, right eye: counts fingers at ten feet; left eye, normal without correction. One month after first examination the right eye vision was 20/100, improved to 20/50 with glass. The fundus was dimly visible. The left eye showed almost complete absence of opacities.

E. C. E.

Ocular Disease of Dental Origin.

Ibershoff, A. E. (*The Journal of Ophthalmology and Oto-Laryngology*, July, 1915), adds two cases to the three reported in the May number of *The Journal of Ophthalmology and Oto-Laryngology*. In the first case the patient had uveitis in right eye; vision, 20/200 with correction. Many small dots on Descemet's membrane, and a dense central cloudiness of the vitreous. The patient had several bad teeth. She was given iodids, hot applications, dionin and massage and was sent to a dentist. One week after having teeth put in order the vision in the right eye without correction was 20/40. In one month the vision with correction was 20/30, and the opacities of the media had very nearly disappeared.

Case 2 had disseminated choroiditis in the left eye; vision, 20/40; field irregularly contracted, with absolute scotoma in the affected zone. The ophthalmoscope showed deposits on Descemet's membrane and a hazy vitreous with web-like opacities. This patient had an abscessed tooth which was extracted. About two weeks later the media were clear and the vision with correction was normal, except in the degenerated area. The patient reported later that she had no subjective symptoms.

Ibershoff thinks these cases furnish evidence of a direct etiologic relationship of uveal disease to dental caries, and suggests the possibility of a "vicious cycle" as explanation of the several phenomena noted. E. C. E.

Three Valuable Sutures in the Operation for Advancement.

EWING, A. E. (*The American Journal of Ophthalmology*, May, 1915), has added three sutures to the five which he formerly used in the advancement operation. The position of these sutures is well shown by diagrams. He uses the sutures to close the conjunctival wound and to support the new attachment of the muscle, should the other sutures become loosened. The eight double armed sutures are introduced after exposing the muscle, but before it is severed, sutures one, two and three are placed at the point of the tendinous insertion of the muscle, and advancement sutures four, five and six are then placed through the muscle at some distance from the insertion, leaving the part of the muscle to be resected between them and the first three sutures. These sutures are passed from behind the muscle. The last two sutures are introduced well back in the muscle from the conjunctival surface, in such a way as to include the conjunctiva and the muscle. After grasping the muscle with the advancement forceps, it is divided near its tendinous insertion. The globe is then brought to slight overconnection by fixation forceps, and sutures one, two and three are passed through the muscle from behind at the proper position and out through the distal conjunctiva. Then the conjunctiva near the cornea is undermined and sutures four, five and six are passed under it so as to get a hold in the episcleral tissue. These are brought out through the conjunctiva, the upper one forty-five to sixty degrees above the horizontal meridian, the lower one the same distance below the horizontal meridian, and the middle one so as to include the horizontal meridian in the tie. The opposite muscle is then tenotomized and sutures four, five and six are tied, bringing the globe into the position desired. Sutures seven and eight are then passed through the tendinous insertion of the superior and inferior oblique muscles and tied. Sutures one, two and three are then tied and the wound of the conjunctiva at the site of the tenotomy of the opposite muscle is closed. It is difficult to follow this description without the diagrams which accompany the article. E. C. E.

Melanosarcoma of Ciliary Body Followed by Fatal Metastatic Tumor in Abdomen.

Luedde, W. H. (*The American Journal of Ophthalmology*, June, 1915). Mrs. X., white, widow, aged sixty-five years, was first seen November 14, 1910, for refraction. She was given O. D., — 0.50 sph. ○ — 1.00 cyl. ax. 150°; O. S., + 0.50 sph. ○ + 0.50 cyl. ax. 75° for distance and + 2.25 sph. added for reading. With this correction her vision in right eye was 16/19; in left eye, 6/12. Ophthalmoscopic examination revealed nothing pathologic.

Three weeks later she returned, having inadvertently exchanged glasses with someone. At this time an examination of the right eye showed a subconjunctival pigment streak at the upper nasal limbus which measured 0.8 millimeters long and 0.32 millimeters wide. There was also a dark discoloration of the base of the iris in this quadrant. The pupil dilated irregularly. The fundus was normal, but a mass was seen between the iris and the lens in the upper nasal quadrant, and Descemet's membrane showed fine diffuse deposits. The field was retracted on the temporal side. The Wassermann was negative, but specific treatment was given. The patient was not seen again until May 10, 1911, when her correction was — 3.00 sph., which gave her vision in right eye of 16/48. The lens then showed some opacities and the pupil was irregular, but there was no appreciable increase in the size of the growth. The left eye also showed opacities in the periphery of the lens. The patient refused to remain under observation and was not seen again until one year later. The vision with correction remained unchanged, but the tension in right eye was forty-three millimeters; in left eye, fifteen millimeters. The mass had increased considerably in size. The clinical diagnosis was now unmistakably melanosarcoma of the ciliary body, and enucleation was advised. The patient refused this treatment. Four months later she returned, suffering intensely from pain in the right eye. The tension then was sixty-five millimeters in this eye and the vision reduced to 16/150. The eye was enucleated three days later. About one year after the enucleation she consulted Dr. H. W. Soper, who furnished the following report:

"She complained of general soreness about the back and sides, with general weakness and loss of weight. These symptoms had persisted for two months. A small hard mass was found just above the umbilicus, very deeply seated and apparently attached to the vertebral column. There was no evidence of any primary lesion in the gastrointestinal tract. This mass grew quite rapidly and other large masses formed in the peritoneal cavity, evidently metastatic in origin. There was no operation nor autopsy, and we never determined the exact nature of the growth."

She died December 8, 1913, fourteen and one-half months after the enucleation and three years after the primary growth appeared in the eye. E. C. E.

On the Retrogression of Retinal Glioma.

Meller, J. (*The American Journal of Ophthalmology*, July, 1915), reports a case of undoubted glioma which in five years has not only not progressed, but, on the contrary, has undoubtedly retrogressed. The patient, a four-year-old boy, was first seen on July 20, 1910. The history was that since birth the right eye had shown a divergence and had had a peculiar appearance. The parents were of the opinion that the eye had always been blind. During the past few months the parents had noticed a yellow shining appearance in the pupil. The boy was well developed and lively. The right eye had normal motility, but was in a decidedly divergent position. The anterior part of the globe was normal, but with oblique illumination an intensely yellow reflex was seen to come from the detached retina which lay close to the posterior lens capsule. In this yellow mass numerous blood vessels were seen. The diagnosis of glioma could not be doubted.

Ophthalmic examination of the left eye showed three circumscribed nodules of tumor tissue. These nodules had a yellow reflex and contained large tortuous blood vessels. The largest of these nodules was situated in and down from the papilla and was several disc diameters in diameter. It protruded far into the vitreous. The vessels going downward from the papilla were very thick and tortuous.

In spite of the certainty of the diagnosis the parents refused to have both eyes removed. Roentgen rays were used on the eyes on July 26th and 27th. Potassium iodid was given internally and a bathing cure used. On September 5, 1910, the child was brought back with severe pain and increased tension in the right eye. This was enucleated.

The child was seen again on June 28, 1911, and the condition of the left eye was unchanged. In December, 1911, the boy was again examined, and it was thought that the tumor had increased somewhat in size. No change was noted in 1912. The child then disappeared until March, 1915, when he came back a strong boy. The focuses persist in the retina in the same form and diameter as on the last examination, but are flattened and have very much the appearance of atrophic choroiditic foci. They differ from this, however, in consisting of crumby, chalk-like white masses. The histologic findings in the enucleated eye show a typical glioma exophytum. Otherwise the eye shows the usual signs of secondary glaucoma in a tumor eye.

The uniform and simultaneous retrogression of the tumor formation in all three nodules in the left eye is a point which merits attention. One nodule might by circulatory disturbances become necrosed and result in the destruction of all tumor cells, but this could hardly explain the simultaneous changes of the same degree in all these nodules. "Only a simultaneously acting agent, perhaps present in the blood, could be sufficient to produce such alterations."

The clinical picture of glioma may be produced by products of inflammatory processes, but this cannot be considered in the present case. The ophthalmoscopic picture of glioma is so characteristic as not to be confounded with other affections.

"We surely are not foolish enough to speak of a cure of this glioma, because we cannot know whether living tumor cells are not left behind which suddenly may begin a rapid growth again."

Cases of retrogression of a glioma have been reported before, but this retrogression has always been accompanied by a shrinking of the globe, except in the case recently reported by Axenfeld. This case was given intense irradiation with Roentgen rays, and Meller remarks that the two irradiations in his case might be the cause of the retrogression.

E. C. E.

Vertex Refraction in Its True Aspect.

PRENTICE, CHARLES F. (*Ophthalmic Record,* June, 1915), emphasizes the fact that lenses of the same refractive power are not interchangeable when they are of materially different forms, especially when over 3.5 diopters in strength. However, if the focal length of a lens be measured from the vertex of the lens proximate to the eye, form and thickness may be ignored. A table is appended showing to what extent the values of lenses are affected by their thickness. G. S. D.

The Colloidal Theory of the Pathology of Glaucoma.

McCAW, JOHN ALEXANDER (*Ophthalmic Record,* June, 1915), discusses Fischer's theory, and reports the results of experiments on the absorption of fibrin in different solutions, and also on the behavior of sheep's eyes placed in varying strengths of different acids. His experiments lead him to the conclusion that the cause of edema lies in the tissues. A state of edema is induced whenever in the presence of an adequate supply of water the affinity of the tissue colloids for water is increased above normal. This affinity is due to accumulation of acids within the tissues. Glaucoma may be well explained by these properties of the tissues. The writer supports Fischer's theory. G. S. D.

The Advantage of a Small Amount of Astigmatism With the Rule.

WIPPER, OTTO (*Ophthalmic Record,* June, 1915). This consists of a short argument, with illustrations, to prove the writer's contention. G. S. D.

A Plea for the More Uniform Reporting of Visual Acuity.

GRADLE, HARRY S. (*Ophthalmic Record,* June, 1915), gives two tables, by referring to which the correct size of letters for measuring visual acuity at different distances may be learned and fractional values may be turned into decimal notation. G. S. D.

An Operation for the Prevention of Symblepharon.

STARR, ELMER G. (*Ophthalmic Record,* June, 1915). In the writer's practice the following operation is the only one which has been successful in preventing symblepharon:

The lower eyelid (when this is the one affected) is completely divided from its margin down to the bottom of the cul-de-sac, and the two flaps or halves are stitched respectively to the side of the nose and to the cheek, where they are kept covered with a sterile dressing until new mucous membrane has formed over the injured surface, when the cut edges of the lid are freshened and stitched together in their normal position. Thus injured surfaces are kept separated until healed. According to the writer this procedure results in complete restoration of the fornix and unimpaired mobility of the eyeball.

G. S. D.

Ciliary Processes in the Pupillary Area.

Clapp, C. A. (*Ophthalmic Record*, June, 1915). Patient was a child five months old. The parents believed the sight to be affected. At the age of one month the arms and legs became paralyzed, which lasted one month. Pupils were immobile to light, but dilated slowly with atropin.

Examination then showed fringe-like patches of dark color, about ten in number, extending around the pupil, leaving a very small central opening through which the nerves could be seen.

One year later the right eye showed an occluded pupil and deviated outward. Sight was fair in the left eye. There was a typical congenital syphilitic choroiditis in the left fundus.

Three years after the first visit the fringe was still seen about the pupil, but much smaller in extent. There were seven diopters of myopia by retinoscopy.

In 1915 three processes can still be seen above and two below.

Siegrist reported a somewhat similar case, which apparently followed a traumatic cataract and adhesion of the ciliary processes to the capsule.

Other cases are those of Schweigger and Fisher.

G. S. D.

An Improved Hat Pin for Visual Field.

Maddox, E. E. (*Ophthalmic Record*, June, 1915), uses a white-headed hat pin, the pointed end of which is run into a short cylinder of wood, cork or rubber tube. By rotating this cylinder in the fingers, considerable movement of the head of the pin may be obtained, and yet the taking of the field of vision is not complicated by movements of the arm and hand.

G. S. D.

A New Hand Campimeter.

Peter, Luther C. (*Ophthalmic Record,* July, 1915). This consists of a blackboard fourteen inches square, to the bottom of which is attached a metal quadrant of a circle. The instrument is supported by a handle and easily held in position by the patient. Circles are drawn with mathematic accuracy, and the normal blind spot is carefully charted.

Peter, after studying a number of cases, finds the average normal blind spot to be twenty-one millimeters long and fifteen millimeters wide at a distance of six and one-half inches, or seven degrees by five degrees. The average distance from the point of fixation is thirteen and one-half degrees. Within the twenty degree circle a test object of two millimeters is used; beyond this point a five millimeters disc. This campimeter is designed only for examination of the central field up to the forty-fifth degree. A specially devised chart is used to record the results.

Peter believes that the examination made at this distance is more accurate than that at the greater distance suggested in the Bjerrum method. G. S. D.

Wide Aperture Lenses—Punktals and Katrals.

Prentice, Charles F. (*Ophthalmic Record,* July, 1915), describes these lenses and gives tables showing their values.

G. S. D.

Hypertrophy of the Conjunctiva (Case Report).

Shoemaker, William T. (*Ophthalmic Record,* July, 1915). Patient, a colored boy, fourteen years of age, had been under observation for three or four years and showed no change in his condition. He had what might be described as an enormous overgrowth of the lymphoid elements of the palpebral conjunctiva and that of the lower and upper fornix. Conjunctival surface was thrown into many tumor-like elevations crowded together and more or less polygonal in form. The lids were thickened and heavy, and the palpebral fissure narrowed. The process was present in both eyes, but more marked in the left.

Pathologic report showed simple hyperplasia of the conjunctiva.

Shoemaker was unable to make a satisfactory diagnosis, but believed that it did not fit into any of the classes of tuberculosis of the conjunctiva. The disease perhaps belonged in the category of hyalin, amyloid or colloid degeneration.

G. S. D.

Primary Syphilis of the Conjunctiva—Fibroma of the Orbit.

Mathewson, George H. (*Ophthalmic Record,* July, 1915). A man, thirty-three years of age. showed a greatly thickened right lower lid. There was glandular swelling of the conjunctiva and an ulcer four millimeters by two millimeters near the bottom of the fornix. Right preauricular gland and the glands in the right submaxillary region were much swollen. The Wassermann reaction was positive, and large numbers of spirochetes were found.

Under salvarsan and mercury the ulcer and glandular swelling cleared up rapidly.

In the second case the eyeball was proptosed one and one-half centimeters and freely movable. The cause of the proptosis was a large tumor which occupied the upper outer part of the orbit. There was a slight optic neuritis. The tumor was removed through an incision in the line of the eyebrow. It measured three and one-half millimeters by two millimeters by two millimeters. Histologically it proved to be a fibroma.

G. S. D.

New Retractor for Extirpation of the Tear Sac Operation, Exterior Frontal Sinus Operation and Infant Mastoid Operation.

Vail, Derrick T. (*Ophthalmic Record,* July, 1915). This instrument is a combination of the features of Allport's mastoid retractor and the swinging hands of Axenfeld's lacrimal retractor.

G. S. D.

A Case of Gonorrheal Iritis Following Traumatism.

Lamb, Robert Scott (*Ophthalmic Record,* July, 1915). Patient, a jeweler, thirty-two years of age, sustained several cuts of both eyelids of the left eye. Three days later he developed pain in the eye and increased tension. The lids were much swollen, the iris inflamed with posterior synechiæ and the tension was + 3. It proved that the patient had had an attack of gonorrhea five weeks previously.

A sensitized bacterin was used in the treatment, and under this the disease quickly cleared up. G. S. D.

Congenital Aphakia.

Hardy, William F. (*Ophthalmic Record,* July, 1915). References to this condition are very rare in the literature. Mohr has described a case of congenital aphakia in a pig. Gratiot found congenital corectopia with aphakia in a patient thirty years old. Lateral nystagmus, vitreous opacities and atrophic spots in the choroid were also present. It is somewhat doubtfull whether this case was a true congenital anomaly.

Toufesco, in 1904, summarized the fifteen cases previously reported. In only two of them did the globe possess nearly normal dimensions. In one of the others there was cyclopia, in one cryptophthalmia, and in eleven microphthalmia. Toufesco's case was in a congenital syphilitic; right eye showed a typical coloboma of the iris, and a defect in the floor of the globe.

In a certain number of the cases reported the crystalline lens had been present, but became absorbed during the fetal period. G. S. D.

Report of Three Cases of Monocular Blindness Due to Sinus Obstruction, With Recovery of Vision.

Brophy, John F. (*Ophthalmic Record,* July, 1915). No. 1.—Sudden loss of vision in the left eye in a woman of twenty years. Examination showed vision 20/200. Field showed contraction above and on both sides, the lower half being entirely lost. The ethmoid and sphenoid cells were filled with exudate. Following operation there was a continued improvement of vision after the third day. Some broadening of the field occurred, but the defect still remained when treatment was discontinued. Vision, however, was 20/20.

No. 2.—Male, eighteen years old. Sudden loss of vision in right eye. Marked contraction of field. Exudate in the ethmoid and sphenoid cells. Operation followed by improvement in the vision.

Scotoma present in the field.

No. 3.—Female, thirty-two years old. Marked loss of vision in the left eye following severe headaches. Examination showed old hemorrhages scattered over the retina. Disc swollen four or five diopters. Marked concentric contraction of the field. X-ray examination showed exudate in sphenoid and posterior ethmoid. Operation was followed by a slow but steady improvement in vision and enlargement of the field. Vision finally became normal.

Case 3 shows that even in disease of some duration the prognosis may not be unfavorable. G. S. D.

Case of Bilateral Subconjunctival Hemorrhage Apparently Due to Centrifugal Force.

BRADBURNE, A. A. (*Ophthalmic Record,* July, 1915). A girl, of twenty-one years, by profession an acrobat, showed a marked concentric discoloration in both eyes. This occurred after her first rehearsal of a feat in which she was rapidly spun from left to right about three dozen times around a vertical axis. G. S. D.

Acute Axial Optic Neuritis as an Early Symptom in Disseminated Sclerosis.

SHUMWAY, EDWARD A. (*Ophthalmic Record,* August, 1915). According to Uhthoff, involvement of the visual tracts occurs in nearly one-half of all cases of multiple sclerosis. Atrophy, usually of the temporal half, is the lesion found, and the typical field alteration is a simple scotoma. In characteristic cases the atrophy does not become complete, but leaves a considerable amount of vision. Sometimes the onset is sudden and the condition resembles the acute axial or retrobulbar neuritis found in association with sinus complications. The visual disturbance is often the initial symptom of multiple sclerosis and may precede other symptoms of the disease by many years. Very often the etiology of a retrobulbar neuritis is very obscure.

Fleischer made a study of the subsequent histories of all cases of acute retrobulbar neuritis seen in the Tübingen clinic and also the cases of acute papillitis with similar histories. In thirty patients with acute axial neuritis the ocular disturbance was the initial symptom of disseminated sclerosis in sixty-six per cent of the cases; while in twelve cases of acute papillitis, one-half subsequently developed the disease.

The case reported here is that of a man, twenty-nine years old, who noticed failing vision in 1907. Vision was 6/22 in the left eye, and there was pallor of the temporal half of the optic nerve and a scotoma for colors. The sinus examination showed a necrosing ethmoiditis. Operation on the nose was performed, and under that and treatment vision improved somewhat, but fell off again to 6/22, where it still remains.

In 1908 there was some weakness in the right hand and muscles of the leg.

Three years later Dr. Spiller found a weak left leg with exaggerated knee reflexes.

In 1914 the diagnosis of insular sclerosis was made.

In the isolated occurrence of acute axial neuritis, a probable diagnosis of multiple sclerosis should only be made if toxic, hereditary, acute or chronic infectious processes can be excluded. It is most important to look for disturbances of the gait, reflexes and sensation. G. S. D.

Shrapnel Wound of the Occipital Region With Involvement of the Visual Centers.

Wood, Casey A. (*Ophthalmic Record,* August, 1915). The case, aged twenty-one years, was a soldier in the British army, who was struck in the back of the head by a shrapnel. He did not become unconscious. Three days later he was told that he had a depressed fracture which had been elevated. Three weeks after the injury operation was done to relieve extensive infection of the scalp and neck, and an irregular piece of shrapnel shell was removed. Three weeks later he had a convulsion.

He was seen by the writer four months after the original injury. At this time he presented a definite blurring of the outlines of both nerve heads. The fields of vision were contracted for white and colors. G. S. D.

Birth Injuries of the Eye—Report of a Case Presenting a Rupture of Descemet's Membrane.

Small, Charles P. (*Ophthalmic Record,* August, 1915). Practically all birth injuries of the eye have followed a difficult instrumental delivery, and all sorts of different forms of injury have been described following the use of forceps. Forceps may cause fractures, depressions, and produce intracranial, intraorbital and intraocular hemorrhage.

Stumpf and von Sicherer found hemorrhage in the retina and optic nerve in forty-two out of two hundred children examined shortly after birth. Injuries of the cornea are the most frequent of all birth injuries.

According to Parsons, there are three varieties of corneal changes: (1) a diffuse opacity, due to edema, which is transitory; (2) a diffuse opacity, which is permanent, probably due to edema with consecutive inflammatory changes and rupture of Descemet's membrane; (3) a linear opacity, which is permanent, and due to rupture of Descemet's membrane.

A small patient, eleven years old, said to have been delivered by forceps, weight fourteen and one-half pounds. There were several scars on the head made by the forceps. The cornea showed three linear opacities extending vertically across the entire cornea. Lens was practically opaque and dislocated upwards. Also tremulous iris. Optic nerve was atrophic and tension was somewhat increased.

The other eye was normal. G. S. D.

A Cataract Incision Leaving an Undetached Conjunctival Flap With Bridge of Conjunctiva on Temporal Side.

Todd, Frank C. (*Ophthalmic Record,* August, 1915), described the advantages of the conjunctival flap in cataract extraction and considers the various methods of making flaps. He has devised the following procedure:

After puncture and counterpuncture have been made, the handle of the knife is turned downward so that the end of the blade on the nasal side does most of the cutting. The incision is carried well up on the eyeball in the conjunctiva, so that the incision on the nasal side ends in the middle line above the cornea or even to the temporal side. The temporal incision is very short, perhaps not covering more than twice or thrice the width of the blade. The bridge of conjunctiva is sufficiently large to allow counterpuncture to be made without placing the spoon beneath the flap. Irrigation can be performed through the incision.

The writer believes that this operation has the advantages of the suture without its disadvantages, and that it is easier to perform than operations previously described. He has performed it in thirty-seven cases with various satisfactory results. In four other cases he found it necessary to sever the bridge. G. S. D.

Annular Opacity of the Lens Following a Penetrating Wound Into the Vitreous Chamber.

HOLLOWAY, T. B. (*Ophthalmic Record,* August, 1915), in 1912 reported a case of the socalled Vossius ring of the lens and referred to a second case. Since that time he has seen three other cases. In the majority of instances the opacity has resulted from blunt force, although in several cases it occurred in penetrating wounds, anterior to the lens in all but one instance.

The first case here described was struck on the eye by a piece of metal. There was a small oblique perforating wound of the sclera, nine millimeters from the limbus, through which a bit of vitreous protruded. Cornea was clear, pupil moderately dilated, and the vitreous showed string-like hemorrhages. Steel was extracted by the magnet.

One week later a cyclitis had developed. There were opacities in the posterior part of the lens, and anteriorly there was a well-marked Vossius ring. In three weeks the lens had become perfectly clear.

In the second case there was a contusion of the left eye. Twelve days later a Vossius ring in the subsiding stage was observed. Five weeks later no trace of the opacity could be found.

There was only one case that Holloway has been able to find which resembles the first reported here. Indentation of the cornea forcing it against the iris does not appear to be essential for the production of this lesion, as shown by the two posterior cases and several others. G. S. D.

An Interesting Case of Acute Retrobulbar Neuritis.

WILLIAMS, CARL (*Ophthalmic Record*, August, 1915). The patient, a female, received a blow on the left eye four days previously. Up to this time her eyes had been normal. The vision of the left eye fell to 5/30, and in the macula region was a light area of what was probably edema. There was a small central scotoma. The right eye showed an old patch of pigmented choroiditis.

Following a slightly positive Wassermann, mercurials and iodid were prescribed and vapor baths given. Thirteen days after the time she was first seen the vision was normal.

One month later there was a second attack of blurring and the vision rapidly went down to counting fingers at one foot. Disc was slightly pale and blurred at the nasal margin. Rapid recovery once more occurred.

A third attack took place.

During the eye trouble there had been some disturbance of menstruation, and some months later disturbances of sensation made their appearance in the lower half of her body. Williams discusses the possibility of a beginning multiple sclerosis.

G. S. D.

Spontaneous Dislocation of a Sclerosed Lens Into the Anterior Chamber.

KRAUSS, FREDERICK (*Ophthalmic Record,* August, 1915). Dislocation of the lens took place without injury or other cause. Extraction was carried out with loss of vitreous. The lens was hard in texture and of a dark brown color. Three months after operation with a suitable correction vision was 5/7. Examination of the lens showed that rupture of the zonula had taken place. G. S. D.

An Operation for the Direct Drainage of the Lacrimal Sac Into the Middle Meatus From the Standpoint of the Ophthalmologist.

PRINCE, A. E. (*Ophthalmic Record,* August, 1915), believes that an operation is desirable for drainage of the sac into the middle meatus, avoiding scarring of the skin. The steps are as follows: (1) local anesthesia; (2) the punctum is opened and a canaliculus knife is passed into the sac; (3) a lacrimal grooved director is passed through the sac and into the nasal canal; (4) a groove of the director is directed toward the nose and the approach to the sac is slit by passing a cataract knife along the groove—this opening is stretched with a large lacrimal probe; (5) a gouge four millimeters wide is now passed into the bottom of the sac and through pressure enters the middle meatus and can be seen from below; (6) a strip of sheet lead, thirty millimeters long, four millimeters wide and one millimeter thick, with the point slightly tapered, is introduced, and with it as a guide the inner wall of the sac and the lacrimal bone can be removed. It is unnecessary to remove any portions of the middle turbinate. Cuts of instruments are described. G. S. D.

Keratitis Caused by Infection With the Bacillus Coli.

MacLeish, A. C. (*Archives of Ophthalmology*, July, 1915). Two cases of metastatic ocular inflammation associated with bacillus coli toxemia have been described by Arnold Lawson. These were cured by the administration of autogenous vaccine and urinary antiseptics.

A case of marked keratitis of both eyes in a young girl, seen by Mr. S. H. Browning, is also alluded to.

The writer then describes five cases from his private practice, each one showing a keratitis of a vesicular type accompanied by chronic cystitis or recurrent diarrhea or both. In each case a pure culture of the bacillus coli was obtained from the urine, and in one case the same organism was recovered from the aspirated contents of the anterior chamber.

The condition is notable on account of its great resistance to the ordinary methods of treatment. Patient complains of discomfort, failing vision, photophobia and lacrimation. Conjunctiva is congested. There is some circumcorneal injection. The iris is a little involved. Cornea looks diffusely clouded and has the appearance as though much diluted milk has been spread over it. It shows also some highly refractive circumscribed, rounded areas.

On focal illumination numerous minute vesicles are seen. Pain is complained of only when the vesicles are present. As a rule, the vesicles are denser in the lower half of the cornea. Deeper opacification can also be seen.

The youngest case was over sixty years of age, the oldest seventy-eight. The longest duration of the disease was seven years, and the shortest one year at intervals.

In three cases there was cataract as a complication. Every case had chronic cystitis, and three showed a chronic diarrhea. In each case the urine was cloudy and the organism found by culture from catheterized urine. In three cases there was a pure bacillus coli infection. In two cases both eyes were involved; in three cases only one.

The injection of increasing amounts of autogenous vaccine combined with urinary antiseptics and buttermilk diet gave beenficial results. Case histories are appended. G. S. D.

Double Chancre of the Eyelid.

FINLAY, C. E. (*Archives of Ophthalmology*, July, 1915). Patient, forty years old, a female and worker in a tobacco factory, showed a large round ulcer at the external canthus of her left eye. The floor of the ulcer was necrotic. A similar ulceration was present at the inner canthus. There was a small round nodule of infiltration on the margin of the lower lid between the two ulcers and considerable edema of both lids and conjunctiva. Preauricular and submaxillary glands enlarged. There were no mucous patches in the mouth or throat, and no other secondary manifestations.

The first tests for spirochetes were negative, as was the first Wassermann. Later both were positive. Mucous patches then appeared. Under treatment the ulceration soon cleared up.

Finlay goes on to describe the characteristics of chancre of the eyelid and the methods of infection. In the factory in which the patient worked one hundred to two hundred women at the end of each day washed their hands and faces in the same basins and dried them with the same towel, which custom was undoubtedly responsible for her infection.

The writer has found eight other cases of double chancre in the literature and one of triple chancre. G. S. D.

A Form and Color Test Object for Perimetric Work.

PETER, LUTHER C. (*Archives of Ophthalmology*, July, 1915). This consists of a small oval disc in which are contained white, red, green and blue discs in sizes varying from one and one-half to ten millimeters. Changing of the colors is controlled by a small slide in the handle, and the size is regulated by a milled wheel. Thus the colors may be instantaneously shifted under the control of the operator. G. S. D.

A Contribution to the Study of Bitemporal Hemianopsia With New Instruments and Methods for Detecting Slight Changes.

WALKER, CLIFFORD B. (*Archives of Ophthalmology*, July, 1915). This paper deals with the prognosis of late cases and the diagnosis of early cases of bitemporal hemianopsia due to hypophyseal dystrophus, as shown by a method of perimetry involving a special perimeter and series of discs. The perimeter is essentially a section of a sphere extending 35° to 95° about the center and adjustable for eccentric fixation. The series of nine discs range in size from 0.15 millimeter to 4 centimeters in diameter, so that each disc has one-half the diameter of the next larger and twice the diameter of the next smaller. The normal, or 5 millimeter disc, is taken as the starting point.

The normal size and above are used to determine the prognosis, according to the presence or absence of the "temporal island," and of response to large discs in the defective areas.

The discs smaller than normal are used in the earlier cases where typical diagnostic field changes may be found only with the smallest discs. The "cæco central" scotoma, the temporal island and the gourd-shaped upper temporal quadrant defect may be present in both groups. The following conclusions were considered noteworthy:

1. In general, field examinations are not complete unless discs representing a large range of visual angles (from 1.7° to 8°) are used, according to the requirements of the case.

2. Field defects found to the normal disc should be examined with a larger series of discs, to determine as much as possible concerning the prognosis and status of atrophy or optic block.

3. Cases showing no defect to the normal discs should be examined with the smallest series of discs as a test for the earliest changes for diagnostic purposes.

4. Temporal islands of vision occur in these cases on and below the horizontal line in the region of 30° to 50° from the center; these islands probably represent the strongest part of the temporal field and add encouragement to the prognosis.

5. Response to large discs in a defective field is also of encouraging prognosis.

6. Cæco central regions are the weakest part of the field, and field defects usually extend vertically through this region, more marked, as a rule, from above than from below.

7. Scotomatous cases may be the result of the hypersensitive macular or cæco central fibers exposed to toxic as well as pressure effects of the growth.—(Reviewed by C. B. Walker.)

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. FREDERICK, M. D.,

SAN FRANCISCO.

JESSE S. WYLER, M. D.,

CINCINNATI.

Progress in the Treatment of Cataract in India.

SMITH, HENRY (Les progrès du traitement de la cataracte aux Indes, *La Clinique d'Ophtal.*, November, 1914), notes that it is seventy years since cataract extraction succeeded the couching operation, with statistics taken from the Indian Medical Service. In 1898 Smith started the intracapsular extraction in Punjab, and since then, due to the good results, the increase in cases has been tremendous. In 1913 over thirty-one thousand catracts were operated in entire India, with more than half in Punjab, whose population is about one-fifteenth of the whole. The points in the newer technic are mentioned, and the author's mode of teaching by observation and then practice under his guidance upon living material. His pupils comprise all races, classes and religions. Besides, Smith is compelled to do general surgery, official duty, direction of the prison sanitation and legal medicine to a province of a million people.

It is time to found a school of ophthalmology in the midst of all this material, but money is lacking. The government gives aid to schools of tropical medicine, but has done nothing to advance surgery. In India, medical fakers still persist, but when efficient surgery is performed, nothing appeals to the native to such a degree, and the cause of civilization is greatly advanced.

The plea for a school is "the research and teaching of the cause of the numerous ocular affections and the prophylaxis of the same. Theoretical and practical treatment of eye diseases. Finally; making such use of the material that the entire world will wish to come and learn in India." J. S. W.

The Prognosis as to Vision Following Attacks of Interstitial Keratitis.

Golesceano (Le prognostic de la vision apres les atteintes de keratites interstitielles, *La Clinique d'Ophtal.*, November, 1914) notes in ninety-six cases, of which twenty-three were followed over a long period, that sex has no influence. Interstitial keratitis is hereditary up to the twentieth year. Where the start is monocular, both eyes become affected in twenty-five per cent of the cases. The symptoms of a few odd cases are reported. Summing up, the author considers interstitial keratitis a grave condition, both etiologically and pathologically as to sight, and that the diagnosis is often most difficult in the prodromal stage. Recurring attacks in the course of the disease may be put at thirty-five per cent. The central infiltration type is by far the most frequent. Mercurial and arsenical therapy during the height of the lesion give the best results. J. S. W.

Gonorrheal Iritis—Manifestations of an Old Latent Condition Diagnosticated by the Complement Fixation Test. Treatment With Vaccines.

Reber and Lawrence (L' iritis gonorrhéique, manifestations d'une gonoccoccémie ancienne latente diagnostiquée par la réaction de la fixation du complément. Traitement par les vaccins. *La Clinique d'Ophtal.*, November, 1914, published October 20, 1915) report three cases.

The first, man of thirty-seven years, married twelve years and father of two healthy children, has what was first thought a traumatic conjunctivitis with no corneal lesion, mobile iris and normal fundus. The symptoms increased and although hyoscin was used, synechiæ formed and iris became edematous and faintly discolored. Patient denied syphilis; admitted a cured gonorrhea fifteen years ago. Urine, prostatic secretions, Wassermann, all negative, but fixation positive. Given four hundred million mixed antigonococcus serum (Mulford), and the pain disappeared within six hours, and the synechia which resisted atropin, broke. Five days later the ciliary injection had gone. Ten days completed the cure, although a second injection was given, as the complement remained positive. Vision, 5/5.

Case 2.—A single man, thirty-two years old, had suffered for years with polyarticular rheumatism and had had two attacks of iritis, positive fixation test, and was given one hundred million dead Neisser cocci, with cessation of pain in four hours; but after exposure the pain returned the following day, and the patient refused further treatment.

Case 3.—Woman, aged fifty-six years, married thirty-six years. Five children living and well. After a train trip she developed a severe iritis with perception of movement at fifty centimeters. All blood examinations negative except for gonorrhea. Mixed Neisser serobacterin (Mulford) and rapid improvement noted. Three injections given at forty-eight hour intervals. Albumin disappeared from her urine and vision is now normal. This formerly would have been considered an idiopathic iritis. A short résumé of the statistic proportions of gonorrheal iritis follows. The authors advise a Wassermann and a fixation test in every iritis case, as many of the socalled rheumatic conditions are due to Neisser infections, and the laboratory holds out the best means for a diagnosis. In the treatment it is questionable whether to use autogenous vaccines, stock or sensitized vaccines, but the rapid course of an iritis makes the preparation of autogenous sera impossible. This source of infection is probably much more frequent than supposed. In an iritis with negative Wassermann, with arthritic symptoms, it is wise to give an injection of sensitized Neisser serum, even in the presence of a negative fixation test. J. S. W.

Contribution to the Study of the Cytochemistry of the Aqueous Humor in Eye Diseases, and Variations From the Effect of Subconjunctival Injections.

Stanculeanu (Contribution à l'étude de la cyto-chimie de l'humeur aqueuse dans les affections oculaires et ses changement sous l'influence des injections sous-conjonctivales, *La Clinique d'Ophtal.,* November, 1914), with his assistant, used the method of y Troncoso and found in glaucoma, inflammatory and simple, an increase both in organic and mineral matter. In parenchymatous keratitis with increased tension the analysis was similar to glaucoma, but in hypotension, the normal findings presented. The early stage of iritis has increased volume of the organic substances. Cases of cataract and sympathetic ophthalmia approach normal percentages. In albuminuric retinitis there is an increase of the organic content without increase in tension, showing that glaucoma is not due to impermeability to the filtration of albuminous substances. Injections of cyanid of mercury increased the albumin in the aqueous, none of the drug being found, and thus the conclusion that salvarsan and other substances reach the eye quicker from intravenous use. Sodium chlorid ten per cent increased the albumin, but to a less degree than the cyanid. Sodium iodid ten per cent passed into the aqueous faster and in greater quantity than when given by any other method. The cytologic findings may be summed up briefly:

1. In inflammatory processes of the eye the cytologic reaction of the aqueous is proportional to the intensity of the inflammation.

2. There is no relation between the cytologic reaction and the etiologic factors in different ocular diseases, and the leucocyte phase varies with each stage of the condition. J. S. W.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D., OPH. D. (COLO.),

DENVER.

Hyalin-amyloid Degeneration of the Palpebral and Tarsal Conjunctiva.

LAGLEYZE, PEDRO (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* January, 1915). The patient was a vigorous boy of thirteen years, who was stated to have been previously free from ocular disease. According to the mother, the left upper lid had been increasing in volume for the previous two months. There was marked thickening of this lid, with an exaggerated mechanical ptosis. Palpation gave the sensation of an almond-shaped tumor extending from the internal to the external canthus, and from the free margin of the lid to the upper border of the tarsal cartilage. The inner aspect of the lid had the appearance of the cicatricial surface following trachoma. The process was distinctly chronic, and there was no symptom of inflammatory reaction. The changes present were at the expense of the lid conjunctiva and of the tarsal plate. The lid could be everted with tolerable ease, but could not be restored to its normal position by the patient by means of the orbicularis muscle. There was neither pain nor secretion, and the cornea, bulbar conjunctiva and the palpebral conjunctiva of the lower lid, as well as the upper transitional conjunctiva, were perfectly healthy. An excellent operative result was obtained from resection of the whole of the upper tarsal plate with the corresponding conjunctiva. Six months later there were absolutely no traces of the tumor mass, and the normal functions of the lid were performed without difficulty. The blood vessels of the excised tissue showed histologically the characteristic changes of amyloid degeneration. Their walls were extremely hypertrophied, forming thick rings. In some sections the vessels were occluded by the thickness of their degenerated walls. Characteristic reactions for hyalin and amyloid were obtained.

Intraorbital Osteoma.

Ferro, Publio B. (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* January, 1915). The patient was a student of nineteen years, who came complaining of the displacement of his left eye, which he had noticed for about a year. The eye was turned downward and outward, and there was an irreducible exophthalmia. There was no diplopia, no changes were found in the fundus of the eye, and the tension and vision of the eye were normal. The tumor was situated about a centimeter from the superior orbital margin, at the junction of its inner and middle thirds. It was removed under chloroform. It was about the size of a walnut, hard in consistency and firmly attached to the roof of the orbit. The patient recovered without exophthalmos or orbital deformity, or interference with the movements of the eyeball.

Intraorbital Foreign Body (Bullet Wound).

Gowland, Alejandro (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* January, 1915). Only three cases in which bullets were lodged within the orbital cavity have been noted in the Lagleyze clinic at Buenos Aires during the past twelve years. In one, radiography showed the ball to be located in the sphenoidal fissure, after having perforated the eyeball. The eye was enucleated. In the second case the ball was lodged in the optic canal, and there was complete paralysis of the motor oculi and of the abducens. This eye was also enucleated. The third case is the subject of the present report. A young woman of nineteen years had been shot by her husband while she was asleep. The ball had entered about two centimeters below the right zygomatic arch. There were slight exophthalmos and chemosis. The tension was normal. There was no spontaneous pain, but tenderness on pressure. The motor oculi and abducens were completely paralyzed. Radiography showed the ball to be located in the upper outer orbital margin, and it was extracted without difficulty. Ophthalmic examination before operation showed the media clear, a diffuse edema at the posterior pole of the eye, more marked around the optic disc, and also scattered hemorrhagic foci, one of which, of large size, covered the whole macular area. After the operation the motor paralysis gradually disappeared. Several weeks after the operation the fundus showed a large white area in the region of the disc, irregular in shape and depressed below the general fundus level, and surrounded by hemorrhagic foci. At the lower part of this area a cicatricial mass protruded into the vitreous. The injury had probably produced avulsion of the optic nerve, together with a portion of the retina.

Contribution to the Origin of the Pigment in Sarcomas of the Choroid.

Arganaraz, Raul (*Boletin de la Sociedad de Oftalmologia de Buenos Aires*, January, 1915). This paper, covering seventy-nine pages of the *Boletin*, gives details of thirty cases, and contains eighteen illustrations. In thirty cases of choroidal sarcoma encountered in an approximate total of one hundred thousand patients who came to the Lagleyze clinic between 1884 and 1913, almost all the tumors were pigmented. A total of fifty-four thousand eye patients treated in the clinic between 1900 and 1913, inclusive, furnished nineteen sarcomas, of which eighteen were melanotic and only one leucotic. Among the cases studied the author distinguishes the following types:

1. The pigment granules are intracellular, each sarcomatous cell containing a certain quantity of pigment.

2. The pigment cells are located in the peripheral parts of the tumor, the central part of the sarcoma being formed of an agglomeration of cells completely lacking in pigment.

3. The pigment cells accompany the blood vessels, occurring around or within these.

4. The pigment granules have no relation with the vessels of the neoplasm, occurring apparently at some distance from them.

5. The pigment granules appear to come from the chromatophores of the choroidal stroma.

6. The pigment appears to be derived from the pigment cells of the retina.

7. The pigment is so thick over the whole surface of the section that no cellular detail can be made out. After decolorization of these sections by the method of Mawas, the pigment cells in various parts of the tumor are found in a state of advanced degeneration.

8. In some sarcomas there are found, alongside cells charged with pigment, others scantily pigmented, and finally others completely lacking in pigment, giving the appearance of a sort of mosaic.

The various theories as to the origin of the pigment are discussed in detail, and the following conclusions are reached: The elaboration of the pigment of melanosarcomas is the exclusive function of connective tissue cells derived from the chromatophores of the choroid. Pigment of hematic origin, in accordance with the theory put forward by Langhans and Gussenbauer, is a rare occurrence in sarcoma of the choroid. The endotheliomas coming from the lymphatic vessels and from the intima of the blood vessels appear to be the only cellular type capable of giving origin to pure leucosarcoma.

Cysticercus of the Human Crystalline Lens.

MARQUEZ AND PITTALUGA (*Archivos de Oftalmologia*, July, 1915). The patient, who admitted having frequently eaten raw pork, came complaining of marked diminution of vision, which had begun a month previously. Marquez suspected the presence of a cysticercus, which protruded into the anterior chamber through the anterior capsule of the lens. With a magnification of ten or twelve diameters the supposed cysticercus appeared in the pupillary region as a body the size of a small grain of rice, opaque, white, with a point of greater density, and apparently inserted in a plane posterior to that of the iris. Pittaluga was able to make out some movements laterally and of retraction, which became accentuated under the action of stimuli and of artificial physical or chemical excitation of the eye. Through a small incision made in the cornea with a lance knife the vesicle was extracted almost in its entirety at the first attempt with iridectomy forceps. In view of the probable formation of cataract an iridectomy was done at the same operation, and about two weeks later cataract extraction was performed. Microscopic examination showed the cysticercus to be derived from tenia solium. No case completely corresponding to the one now described has been discovered in the literature; the one most closely resembling it having been reported by von Graefe (one in eighty thousand patients) and the cysticercus having been located in the vitreous and the posterior part of the lens.

Pavement Epithelioma of the Cornea.

Menacho, M., Barcelona (*Archivos de Oftalmologia*, July, 1915). The tumor occurred in a man of forty-three years, and was said to be of eight months' duration. It was almost round, was located to the inner side of the cornea, and was rather more than four millimeters in its larger diameter. It was rosy in color, granulomatous in surface, and received its blood supply from some conjunctival vessels coming horizontally from the direction of the inner canthus. The patient's other eye had been lost as the result of an injury. The growth was dissected away at its base with a Graefe knife, the operation being completed by galvanocauterization of the surface of implantation. Two and a half years later the eye was still sound. Microscopic examination showed that the neoplasm had been formed exclusively at the expense of the epithelium, and that it was primarily and exclusively corneal.

Best Corneal Flap for the Extraction of Senile Cataract.

Blanco, T. (*Archivos de Oftalmologia*, July, 1915) concludes as follows: To obtain easy exit of the lens in as many cases as possible, the base of the flap should be close to the horizontal diameter of the cornea, the flap including between a half and a third of the transparent cornea. To secure symmetry of the flap in relation to the principal meridians of the cornea, it is most satisfactory to fix with the forceps at the conjunctival limbus, at the level of the inner extremity of the horizontal meridian of the cornea, making the counterpuncture at this point. The section should be made along the line which separates the transparent from the opaque tissue. At the end of the keratotomy it is extremely useful to obtain a small conjunctival flap of about two millimeters.

Contribution to the Clinical Study of Paralyses of the Motor Muscles of the Eye in Cuba.

Santos Fernandez, J., Havana (*Archivos de Oftalmologia*, July, 1915). The percentage of cases of paralysis of the motor muscles of the eye found in a hot climate (Cuba) was not superior to that found in temperate climates. While syphilis played a great part in these paralyses, this infection is not more severe in hot climates.

Second Contribution to the Causes of Blindness.

MENACHO, M., Barcelona (*Archivos de Oftalmologia,* August, 1915). Statistic tables are given under the following heads: (a) General table of the incidence of blindness (bilateral or unilateral, and complete or partial) among ten thousand patients; (b) General table according to age and sex; 1. Binocular blindness, divided into three classes: I. Absolute blindness, by which is meant that the vision is reduced to counting fingers at less than a meter; II. Relative blindness, by which is meant that the corrected vision is less than one-tenth but greater than that characterized as absolute blindness; III. Blind in one eye and semiblind in the other. 2. Monocular blindness, divided into two classes: I. Absolute blindness; II. Relative blindness.

Original Procedure for Manual Tonometry.

BLANCO, TOMAS, Valencia (*Archivos de Oftalmologia,* August, 1915). This article shows an extraordinary ignorance of recent ophthalmologic progress. The author has turned to manual or digital tonometry after becoming disillusioned as to the reliability of the various tonometers which have been tried. He proceeds to mention as the best of these the ophthalmotonometer of Fik, modified by Ostwalt (*Revue Générale d'Ophtalmologie,* November, 1895). No mention is made of Schiötz's instrument. The "original procedure of manual tonometry" consists in raising the upper lid with the operator's left hand and holding it firmly against the upper margin of the orbit, and with the tip of the index finger of the other hand making pressure through the edge of the lower lid against the cornea or sclera, as may be desired. The tension is estimated according to the force which has to be used to produce a moderate depression in the cornea or sclera.

New Operative Procedure for Entropion of the Lower Lid.

MARIN AMAT, M., Almeria (*Archivos de Oftalmologia,* August, 1915), thinks he has found an infallible and simple procedure for the correction of all cases of entropion of the lower lid. He has used it four hundred and ninety-one times. The technic is as follows: A horizontal incision is made parallel throughout with the ciliary border of the lid, three or four millimeters distant from the zone of implantation of the lashes, and sufficiently deep to reach the anterior aponeurosis of the orbit. Separating the lips of the incision three sutures are applied, the needle being introduced in each case through the lower lip of the incision, picking up the depth of the wound and finishing by carrying the suture through the upper lip of the wound. In extreme cases four or even five instead of three sutures may be used. Exceptionally, if there is marked hypertrophy of the orbicularis muscle as the result of permanent blepharospasm, some of the fibers of this muscle may be resected.

Paralysis of the External Rectus Following Rachistovainization.

FERNANDEZ, BALBUENA, S., Gijon (*Archivos de Oftalmologia,* August, 1915). A woman of forty years was operated upon for extirpation of the right tube and ovary, using as anesthetic stovain in intrarachidic injection. Two weeks later she noticed that she saw double and that the left eye squinted. A month later she came for examination. There were all the symptoms of paralysis of the sixth pair. Iodid of potash appeared to favor recovery, which was complete in two months. Twenty other cases have been recorded in which no other cause of paralysis could be found but the intrarachidic injection of stovain.

Penetrating Wound of the Orbit With Retention of the Projectile.

PALOMAR DE LA TORRE, Zaragoza (*Archivos de Oftalmologia,* August, 1915). A man of thirty-three years was injured in the inner wall of the left orbit by a bullet of large caliber, fired at a distance of twenty meters and deformed by rebound against the wall. Radiography showed the bullet to be at the bottom of the orbit. The eyeball was immobile and displaced somewhat forward and upward. The tension was increased, and there was a large detachment of the retina. After the time of the injury no pain was felt. The bullet was readily removed through the wound of entrance, after enlarging this. The patient made an uncomplicated recovery, retaining the eyeball, but with amblyopia, immobility of the globe, and epiphora due to destruction of the lacrimal sac.

Primary Pavement Epithelioma of the Lacrimal Caruncle.

MENACHO, A. (*Archivos de Oftalmologia,* August, 1915). The patient was a man of fifty-five years. He stated that the left caruncle (which had always been larger than that of the other side) had in the past two months taken on a rapid and progressive growth, being at the time of examination eight millimeters in diameter. In form the tumor resembled a cornu cutaneum. It was yellowish in color, and its clinical aspect was that of a papilloma without hairs and with sebaceous hyperplasia. Under the microscope it showed an epithelial structure, with a connective tissue stroma. It contained a number of young epithelial perles, very few of these being completely keratinized. The author suggests that if microscopic examination were done in a greater number of cases of supposed papilloma of the caruncle, the occurrence of epithelioma primary in this structure might be found to be less rare than is commonly believed.

The Ocular Fundus in Rabies.

SANTOS FERNANDEZ, J. (*Archivos de Oftalmologia,* September, 1915), made a careful examination of the ocular fundus in two fatal cases of rabies, without finding any indication of change in the choroid, retina, or optic nerve.

Protection of the Eyes Against the Roentgen Rays.

PONS MARQUES, L., Mahon (*Archivos de Oftalmologia,* September, 1915), obtained complete protection of the eyes of patients against the X-rays by means of capsules of lead one millimeter thick, introduced beneath the lids after cocainization of the conjunctiva and cornea. The lenses of spectacles which are ordinarily sold as protective against Roentgen rays are all more or less permeable, even when their thickness is twice the ordinary and they are placed at forty centimeters from the Roentgen tube.

Catheterization of the Nasal Canal.

SANTOS FERNANDEZ, J., Havana (*Archivos de Oftalmologia,* September, 1915), pleads against persistent catheterization of the nasal canal in cases in which the normal passage of tears is not reestablished after two or three probings. Rather than keep up the traumatism produced by useless catheterization, if lacrimation is troublesome, recourse should be had to partial suppression of the secretion. Santos Fernandez mentions a case in which, although fluid injected with a syringe did not seem to pass into the nose, yet the patient had experienced relief after the first probing, and fluorescein instilled into the conjunctival sac stained cotton placed in the nose. By causing congestion or inflammation in the nasal canal and sac, catheterization may change the patient's condition for the worse rather than for the better.

Further Case of Cure (Spontaneous?) of Detachment of the Retina.

Blanco, T., Valencia (*Archivos de Oftalmologia*, September, 1915). In one case previously described the patient was kept in the hospital twenty-four hours with the intention of starting active treatment. Without any treatment having been used, however, the retina was found to have become reattached throughout. In a second case the patient became completely cured almost immediately after commencement of the treatment, although she had only received one retroglobar injection of chlorid of sodium and had only had two pilocarpin sweats. In the case now described in detail the patient had been kept for some weeks under various forms of treatment, including subconjunctival injections of chlorid of sodium, pilocarpin sweats, increasing doses of iodid, and mercurial inunctions. As no result was obtained the case was given up as hopeless, and for nine days all treatment except the iodid and mercury was omitted. At the end of this period an ophthalmoscopic examination, made as a preliminary to discharging the patient as incurable, showed the detached retina to have become completely reattached, and the vision was found to have risen from 0.02 to 0.15. The author asks whether in many cases the favorable results obtained under various forms of treatment of detachment of the retina are not merely coincidences rather than the outcome of the treatment.

Cure of a Case of Detachment of the Retina.

Pons Marques, L., Mahon (*Archivos de Oftalmologia*, September, 1915), reports a case in which the retina, detached in the lower part of the fundus, became reattached under three injections of a twenty-five per cent solution of chlorid of sodium. Two months later it again became detached, and again became completely reattached in the course of ten days, during which period two further injections of the same solution were given. The vision was restored to normal.

Interesting Acute Recurrent Osteoperiostitis of the Orbit.

Marin, M., Almeria (*Archivos de Oftalmologia,* September, 1915). The patient, a boy of six years, developed at the same time a purulent discharge from the external auditory canal, which apparently came from a deep swelling in the temporal region, and a severe osteoperiostitis of the inner side of the left orbit. There was high fever, exophthalmus, and severe pain. After opening the orbital abscess with a bistoury the periosteum of the inner wall of the orbit was found to be completely detached from the os planum of the ethmoid, which was in part destroyed. A temporary interruption of drainage from the orbital focus was accompanied by a marked increase in the discharge from the ear. After about two months' treatment the patient was discharged cured, the eye itself being unharmed. Two years and four months later the patient returned on account of a repetition of the orbital abscess of the left side. Again, after opening the abscess with a bistoury, the periosteum was found to be completely separated from the inner wall of the orbit. The pus was found to contain the streptococcus, and the patient's recovery was apparently hastened by injection of antistreptococcic serum. The duration of treatment for this attack was thirty-four days, and the patient was again discharged without having suffered any direct ocular lesion. The author considers the simultaneous occurrence of the orbital abscess and of the abscess which discharged through the external auditory canal as having been due to a deep subperiosteal communication by way of the sphenomaxillary fissure and the temporal fossa.

SOCIETY PROCEEDINGS.

BY

ARTHUR J. BEDELL, M. D.,

ALBANY.

COLORADO OPHTHALMOLOGICAL CONGRESS.

HELD UNDER THE AUSPICES OF THE COLORADO OPHTHALMOLOGICAL SOCIETY, IN DENVER, COLORADO,
JULY 22 AND 23, 1915.

(Continued from October, 1915, Number.)

Second Session, Afternoon of July 22d, Continued. Dr. Harold Gifford, Omaha, presiding.

Dr. H. W. Woodruff, Joliet, Illinois, read a paper on

Trephining Versus Iridectomy in Glaucoma.*

Dr. A. E. Prince, Springfield, Illinois, read a paper on

The Mule-Shoe Drain for Chronic Glaucoma.†

JOINT DISCUSSION OF PAPERS BY DR. H. W. WOODRUFF AND DR. A. E. PRINCE.

Dr. E. T. Boyd, Denver, would not advocate trephining for a secondary glaucoma, the result of a plastic iritis, which had caused complete, posterior, annular synechia, with iris bombé. In such case iridectomy is the only operation to be thought of. Iridectomy as performed for glaucoma opens up a portion of the normal filtration angle, while trephining establishes a vicarious means of filtration. Some will say that this fact alone should cause one to favor iridectomy; with this Dr. Boyd partially agreed, provided that the operation was always done by a thoroughly competent operator, but as we are dealing with operations as performed by the average oculist, we should choose the simplest operation possible, consistent with results.

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*See page 1. †See page 8.

Dr. Boyd objected to Dr. Woodruff's suggestion that iridectomy should be done first in doubtful cases, reserving the trephine operation to be done later if iridectomy proved unsuccessful. Trephining should be done in the first place, so as to avoid, as nearly as possible, the necessity for a second operation.

Dr. Boyd referred to statistics prepared in 1907 by Dr. Charles Stedman Bull, with regard to iridectomy for glaucoma. Dr. Boyd regarded trephining as the operation of choice in the following conditions: (1) all cases of primary acute or subacute inflammatory glaucoma; (2) in glaucoma secondary to cataract extraction; (3) all cases of chronic simple glaucoma with contraction of the field, impaired central vision, cupping of the disc and elevated tension, in which the tension was not completely controlled by the use of miotics; (4) all cases of absolute glaucoma, whether painful or not, where it was thought desirable or advisable to save the eye.

Dr. J. A. McCaw, Denver, remarked that in some cases the trephine scar was so dense that it became impervious to the aqueous, while in other cases the exudate from the anterior chamber blocked the wound; and referred to the work of Zorab and Mayo, and later of Wood, who had used the thread procedure and found it to give excellent results. Wood made the point that the channel in which the thread lay would become lined with endothelium and so afford a permanent channel of drainage.

Dr. H. Moulton, Ft. Smith, referred to a patient who had come two years ago with one eye lost from blennorrhea fifteen years previously. Iridectomy had been done by another oculist, and had enabled her to read newspaper print until three or four months before Dr. Moulton saw her. The vision had gradually fallen to 7/200 during this time, and the tension was forty millimeters of Hg. In spite of miotics the vision grew steadily worse. There was no remaining place for iridectomy. A trephine opening at the limbus of the preceding iridectomy gave some improvement of central vision and considerable enlargement of the field, and she is very well off.

Dr. E. S. Thomson, New York, said the gist of the matter was how much you wanted to reduce the tension. In chronic glaucoma the tissue resistance is undoubtedly low. Cupping goes on with a tension of twenty to twenty-five millimeters of Hg. Dr. Thomson believed iridectomy would not reduce the tension below that, whereas trephining would in some cases permanently reduce it to ten millimeters of Hg. In acute cases without cupping of the optic nerve, iridectomy is the desirable operation.

Dr. Robert S. Lamb, Washington, thought there would not be so much recurrence of tension after trephining if the size of the drill were suited to the depth or thickness of the subconjunctival tissue. The thicker this is the more apt we are to have recurrence. It is advisable to dissect the flap freely for some distance on each side of the hole.

Dr. W. F. Hardy, St. Louis, did not think trephining was easier than iridectomy for the average operator to perform. An enthusiast like Dr. Elliot is apt to see all of his cases turn out well; yet we know that not all of the cases do turn out well. Dr. Hardy had seen a case a few weeks ago in which after the trephine operation the patient had a hemorrhage into the anterior chamber which completely blocked the trephine hole. If iridectomy were given a second chance, as trephining is, we might get successful results in many cases that have proved failures.

Dr. J. S. Lichtenberg, Kansas City, thought that since iridectomy was successful in the majority of cases, it was usually the operation of choice; and then if it failed we might do a trephining. He had made it a practice in his operations to try to do a complete iridectomy through the trephine hole. A large iridectomy tends to leave the lymphatic channels open. He thought whatever operation we used we must always give a guarded prognosis. We might have a retrochoroidal hemorrhage after any of our glaucoma operations.

Dr. Harold Gifford, Omaha, had done about eighty-five trephinings. He did not think it a simple operation, nor as easy to do as an iridectomy in a quiet eye. As to final results, he did not think any of us could tell what the results of operative interference were going to be. As to the method of operation, Elliot insists on separating the subconjunctival tissue as little as possible, in order to maintain a large area of normal tissue for the aqueous to drain through. But Dr. Gifford had obtained the impression that you get a wider infiltration area if you dissect the conjunctiva thoroughly along the margin of the cornea away from the trephine site.

Dr. Edward Jackson, Denver, took the ground that iridectomy had been a very satisfactory operation in acute and subacute glaucoma, and was not willing to give it up for trephining. For simple glaucoma where miotics failed to hold the eye completely, he thought that trephining was the operation of choice.

Dr. H. W. Woodruff (closing) said he would certainly not do a trephining on an acute inflammatory glaucoma. Iridectomy is definitely curative in this condition and the patient is not in danger of late infection, whereas trephining may be followed by late infection in this condition.

Dr. A. E. Prince (closing) agreed with Dr. Woodruff as to the matter of acute glaucoma. He thought that was a closed subject. But in cases where repeated iridectomy has not sufficed, if we can hold the tension by trephining, we are doing a great work. As to the choice between trephining and iridectomy, he had got a much higher percentage of good results with trephining than with iridectomy.

Third Session, Morning of Friday, July 23d. Dr. H. W. Woodruff of Joliet, Illinois, presiding.

Exhibition of Patients.

Dr. F. R. Spencer, Boulder, Colorado, showed a case of neuroretinitis of fourteen years' duration, in which marked improvement had followed turbinectomy and ethmoidectomy.

Dr. L. L. Herriman, Alamosa, Colorado, showed a case of pronounced vernal conjunctivitis which had developed in the San Luis Valley at an altitude of about six thousand feet. There were marked hyperplastic changes to either side of each cornea.

Dr. W. C. Bane, Denver, showed a case of pemphigus in which peritomy had been done with definite success for relief of the pain.

Dr. Edward Jackson, Denver, showed a case in which extended tenotomy (complete of the externus and partial of the superior and inferior recti) had been done for external strabismus.

Dr. A. E. Prince, Springfield, Illinois, showed a number of ophthalmic surgical instruments designed by him.

Dr. Edgar S. Thomson, New York, read a paper entitled

Concerning the Surgical Treatment of Retinal Detachment.*

DISCUSSION.

Dr. D. T. Vail, Cincinnati: It has been observed, as an evidence of confusion of ideas as to the origin and treatment of detachment of the retina, that some men recommend trephining for it, although one of the essential conditions in nearly all cases is a hypotension, while the same treatment is recognized as perhaps the most efficient means at our disposal in the treatment of hypertension. These recommendations, however, as not so contradictory as they appear. In the one case we wish to maintain a fistula for the permanent reduction of tension, while in the other we wish to maintain an opening into the subretinal space in order to prevent reaccumulation of fluid beneath the retina; and in order to be logical in the use of trephining in detachment of the retina, we ought not only to remove a disc of sclera, but also to cut a buttonhole in the choroid, which in this position corresponds to the iris in trephining for glaucoma. The great merit of the method of Dr. Thomson and Dr. Curtin is the production of an area through which a hypodermic needle can be repeatedly passed into the subretinal space without the fuss and formality which are necessary in doing repeated scleral punctures.

Dr. Harold Gifford, Omaha: "Hope springs eternal in the human breast," and the surgery of retinal detachment is a striking illustration of this adage. The valuable thing about Thomson's procedure is the opportunity for repeated punctures of the subretinal space through the trephine hole. As illustrating the confusion in the treatment of retinal detachment, Deutschmann has proposed to bisect the retina, whereas, as Dr. Thomson has shown, the rents in the retina are an undesirable complication in looking to any treatment of the condition.

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*See page 20.

Dr. E. L. Jones, Cumberland, Maryland, in the fall of 1913 had had ideal success in the only chance he had had to try the operation, by obtaining continuous drainage subconjunctivally. After very thorough anesthetization, and bringing the conjunctiva well forward, with the electric cautery he burned through the conjunctiva and sclera, leaving the puncture in the conjunctiva a long way from the scleral opening. The purpose of the burning was to leave a lasting opening, for some time at least, and also to prevent hemorrhage. The vision of this eye seemed to be almost if not quite up to its normal standard, so far as could be told. (The other eye was below normal, and this eye was almost equal to it.) The eye slowly improved in vision for five or six months. The use of dionin in conjunction with the operation proposed by Dr. Thomson was desirable.

Dr. F. Park Lewis, Buffalo: Detachment of the retina is a symptom, and rarely occurs in the normal eye. It rarely happens, therefore, that simple mechanical measures give permanent relief. He did not understand that Dr. Thomson proposed that these operative measures should be used in all cases, but in those in which simpler measures have been tried without success. Dr. Jones' proposal to use dionin in conjunction with the operation was of great value. Dr. Lewis had had several cases of marked benefit following the injection of sodium citrate. In using the cautery through the sclera we must be careful of danger to the lens through the use of heat in its near proximity. Cataract has been produced in such cases.

Dr. H. S. Gradle, Chicago, understood that Dr. Thomson got twelve per cent of cures lasting six months. The removal of the subretinal fluid is the almost essential feature, because, as Elschnig has shown, the subretinal fluid has an autolytic action, and it is, therefore, desirable to remove it as early as possible. Would it not be advisable in these cases to either combine or precede the removal of the subretinal fluid with injection into the vitreous, not of animal vitreous, but of normal salt solution, because the sudden removal of the subretinal fluid must lead to a sudden expansion of the fibrillary structure of the vitreous?

Dr. A. E. Prince, Springfield, Illinois, in witnessing a trephine operation for detachment by another surgeon, had conceived the idea of using a gold drain similar to the one he employed for glaucoma, and this plate had been well tolerated by the tissues, although the detachment did not improve. Dr. Gradle had a good idea in the replacement of the withdrawn fluid by injection through the vitreous. Dr. Prince would suggest the use of a small gold plate, arranged as a sort of collar with a projecting flange, and with its sharpened point penetrating the choroid, through which permanent drainage might go on.

Dr. Edgar S. Thomson (closing) said he operated in these cases before the tension had come down and before inflammatory changes set in. There was a very definite period of pouring out of fluid; and after this had gone on for some time the condition remained stationary. If we open the choroid the opening is very apt to close up, on account of the character of the tissue involved. As to Dr. Prince's suggestion, Dr. Thomson was always very shy of leaving anything in the nature of a foreign body in the eye. If the perception of light in the detachment failed, it was a sign to go ahead and operate. The rents he had seen were all present at the first. As regards the injection into the vitreous, it was difficult work, and one was apt to get inflammatory reactions. The vitreous also was capable of a good deal of enlargement, and this matter might be able to take care of itself up to a certain point. If he found supraretinal fluid, he did not go through to the subretinal fluid. It was true that to accomplish anything in these cases the retina must be fairly completely reapplied.

Dr. Linn Emerson, New York, read a paper entitled

Business and Office Methods in Special Practice.*

DISCUSSION.

Dr. W. A. Sedwick, Denver, thought the idea of two men being associated together an excellent one. It is desirable for each man to take his own histories. It is advisable to have the light fall on the patient's face so that you can study the character of the patient. Saving of time is a good thing; but it is not well to be in too big a hurry. A word to the patient on things not directly connected with his case may be of advantage at times, as a means of getting his confidence. It is a good plan to take the vision before touching the eye, because people who have not known that one eye was defective are apt to blame the doctor. Dr. Sedwick thought it desirable to make out one's own bills, even if one must give a little time to it. The patient may wait longer if the bill is in the handwriting of an assistant than if in the doctor's own handwriting. If the patient is prepared to pay cash, Dr. Sedwick adds two or three dollars and then charges a lower amount for cash than if the account is placed on the books. He collects a good many bills by going to the bank and paying ten cents for a draft on the patient. He has taken the clock out of his reception room.

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*See page 29.

Dr. F. R. Spencer, Boulder, remarked that physicians were poor business men, and should have business methods and systems. The office equipment should be so arranged that time might be saved in taking care of one patient after another. Patients should not be operated upon in the office. Records are often better kept on larger sheets.

Dr. J. S. Lichtenberg, Kansas City, considered the arrangement of one's office very important. He uses a desk for records, in the upper part of which cases under treatment are kept, and in the lower part of which the other records are put. He keeps several patients going at the same time by using several rooms. The point about taking the history oneself is important.

Dr. D. T. Vail, Cincinnati, had been asked whether it paid to run a private hospital. If the practice is sufficiently large, it will pay. There would have to be an average of over twenty-five patients a day. In his private hospital he uses the best of everything in diet, and charges $5.00 a day for board, room and nursing, at the full rate, some patients, however, paying four or three dollars. He turns the management of the hospital over entirely to the nurse. If people object to the size of the bill he does not discuss the matter, but asks how much the patient thinks the bill ought to be and tells him to pay that, but has a note made for his future information.

Dr. Linn Emerson (closing) stated that ninety-eight per cent of his bills were sent out by the nurse, but only after marking by him. A small number he keeps on his desk and makes out himself. The advantage of the collector over the lawyer he has found to be that some people are offended if you send a lawyer after them. Not all his operative work is done in the office, but all his cheap cases are done there.

Dr. E. L. Jones, Cumberland, Maryland, read a paper entitled

The Arrest of Cataract at an Early Stage.*

DISCUSSION.

Dr. Melville Black, Denver, thought that the early diagnosis of cataract, at least as early as made by Col. Smith, would be difficult in this country, hence the use of cyanid injections would be limited. He had used dionin for many years. Personally he had never seen results from it or from anything else in these cases that he could surely ascribe to the drug used. The lenticular striations or spicules are subject to variations in number and size that suggest capsular wrinkling. He has seen these cases go twenty years without change for the worse, and it is probably in these cases that we think we are getting results from dionin and other remedies, since we do not know what would have happened had the remedies not been used. No one has reported the control of cataracts in one eye when both eyes were equally involved and the other allowed to go on to cataract ripening.

Dr. H. W. Woodruff, Joliet, Illinois, agreed that it was hard to know whether we were getting results from any form of treatment in beginning cataract. There are some patients whose vision improves although we cannot see any change ophthalmoscopically.

Dr. E. L. Jones (closing) thought that unless the treatment resulted in sclerosing of the lens it did not do much good. In a case in which with dilated pupil he could only get very poor vision, in three days' time under treatment the vision had more than doubled and he could get a quite fair view of the fundus. In six months that patient returned and her vision had improved three or four times in one eye. After six months she was seen again, and the lenses had cleared so well that he could make out that she had albuminuric retinitis, the macula being very well seen.

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*See page 41.

Dr. D. T. Vail, Cincinnati, read a paper entitled

Management of Eyelids During Cataract Operation.*

(Illustrated by demonstrations with the projecting apparatus.)

Dr. Harold Gifford, Omaha, read a paper entitled

The Routine Treatment of Senile Cataract by Expression With a Sliding Conjunctival Flap.†

DISCUSSION OF PAPERS BY DR. D. T. VAIL AND DR. HAROLD GIFFORD.

Dr. C. E. Walker, Denver, had always removed the speculum at the end of the iridectomy, or, if he did not do an iridectomy, after the corneal incision. Dr. Vail's form of retractor appealed to him as one of the best, since the handle was so short as to be out of the way when one was making the extraction.

Dr. Linn Emerson, New York, thought the main objection to the denseness of the flap was well overcome if the flap were sufficiently undermined. He now undermines the flap above, the same as he would do in a McReynolds' operation for pterygium; if necessary, to the middle of the globe.

Dr. R. S. Lamb, Washington, in muscular persons does an external canthotomy at the beginning of the operation. It is desirable to investigate the nasal condition in all these cases. It is not always sufficient to close the tear passages by cautery. He is still convinced that the long conjunctival bridge, eight or ten millimeters long, is the safest protection against vitreous prolapse.

Dr. H. Moulton, Fort Smith, Arkansas: In managing an eye immediately after the extraction, during the socalled toilet, the very slightest pressure of the lower lid against the eyeball causes the wound to gape. We are apt to forget this, and also the fact that this may be responsible for loss of vitreous. The rule should be followed not to allow the lower lid to come into contact with the eyeball until the upper lid is in place.

Dr. E. S. Thomson, New York: The sliding flap not only prevents immediate infection, but also absorption through the corneal wound. He has had much less low-grade iridocyclitis than before using the flap. The flap becomes partly adherent in a very short time, almost while you are looking at it.

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*See page 46. †See page 57.

Dr. D. T. Vail, Cincinnati, recommended canthotomy, not only in cataract cases, but in a number of other conditions. He holds the lower lid down until he has completed the toilet of the eye, and also during subsequent dressings of the eye.

Dr. Harold Gifford, Omaha, had been asked as to the conjunctiva staying over the cornea. He had found that it slid back as soon as the stitch was taken out. Nearly all of the resistance of the patient during the operation could be overcome by thorough anesthetization. The sliding flap does not guard against vitreous prolapse, but does guard against loss of vitreous. You have the assurance that the patient will not lose a lot more vitreous after the eye is closed, which assurance you do not have with the ordinary operation. As regards the danger of epithelium growing into the anterior chamber, microscopic examination of the case referred to in the paper shows that such danger does not exist.

Fourth Session, Afternoon of July 23d. Dr. F. Park Lewis, Buffalo, presiding.

Dr. H. Moulton, Fort Smith, Arkansas, read a paper entitled:

The Use of Lead Styles in Treatment of Stenosis of the Nasal Duct.*

DISCUSSION.

Dr. Melville Black, Denver, makes the style from No. 10 fuse wire by whittling off one end with a knife and then bending it to make the lip, which lies in the slit canaliculus better than when the lip is full size. After full dilatation of the canal and the probe being found to be on the floor of the nose, the style, estimated a little longer than needful, is passed into the canal. A probe is again used to determine that the end of the style is on the floor of the nose. The distance which the lip of the style projects above the slit canaliculus gives the length, plus one-sixteenth of an inch, that the lower end of the style after removal should be cut off. Dr. Black regards the style as especially useful in patients who live out of town and cannot remain for treatment and who object to more extensive operative measures.

Even though the window resection operations prove as successful as we hope for, it will not render the use of the style less desirable in many cases.

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*See page 66.

Dr. A. E. Prince, Springfield, Illinois, had used a larger fuse wire for a long time with great satisfaction. It did not suffice in dacryocystitis or in some cases of pronounced stricture, or in cases of necrosis of the inner wall of the sac. But in a large number of cases it acted very satisfactorily. We must recognize the fact that the Lord did not make the lower nasal duct quite large enough to do anything in a very satisfactory manner when it is obstructed by disease. From the standard of the oculist it looked possible that we should be able to eliminate the lower duct—that is, pass directly from the sac into the middle meatus. Dr. Prince suggested the use of a little plate four millimeters wide; cutting open the sac with a knife and then with a grooved director and a gouge passing directly from the sac into the middle meatus, and passing the little plate into the passage opened by the gouge; then reaching up through the nostril to the place where the plate projected with the tissue resting on it, and biting off the end of the little plate and with it the soft tissue covering it. In this way the lower duct was eliminated entirely.

Dr. E. R. Neeper, Colorado Springs, a year ago had advised a sort of toothed trephine, which in a few seconds could be passed down to the bottom of the sac, turned toward the angle of the opposite jaw, and with very little pressure a clean button cut out through which a lead style would pass easily and without crushing.

Dr. H. Moulton (closing) said that if one measured the style with a probe one would not have to make it over again. In the great majority of these cases the style would succeed. Of course, if there were absolute closure of the nasal duct, it was impracticable to use a style.

Dr. D. F. Harbridge, Phoenix, Arizona, read a paper entitled

Traumatic Rupture of Eyeball, Complete Aniridia; Preservation of Lens With Practically Normal Vision.*

DISCUSSION.

Dr. W. F. Hardy, St. Louis, said that the history of Dr. Harbridge's case deepened a conviction already existing in his mind that we should make haste slowly in advising enucleation following an injury. In aniridia following trauma we should expect much the same sequence of events as that following other injuries, whether instrumental or accidental, provided infection is absent. Where a penetrating instrument, and especially a sharp and hooked one, is the causative factor, it is not surprising that occasionally a happy result is obtained, a good visual result depending on the presence of a clear crystalline lens. In congenital aniridia there are tags, shreds or remains of the iris; and in the traumatic cases there is no reason to think that the same conditions do not obtain. It seems paradoxic that an aniridic eye should have glaucoma, but the presence of a stump or tags of iris clears that situation. The subsequent adherence of these stumps to the posterior corneal surface can so effectually block the filtration angle that glaucoma is brought about. It is well also to bear in mind the fact, which Mayo has accentuated, that the aniridia may be only apparent because of the iris being retracted into the angle and fixed there by adhesions. This may well be, as usually the anterior chamber is full of blood and no satisfactory examination can be made at the time of injury.

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*See page 94.

Dr. Hardy referred to a case in which a small scale of iron with a slightly hooked end, and measuring probably one and a half by three millimeters, had entered the eye of a workman. The foreign body was localized by the X-ray and removed by a magnet within forty-eight hours after the injury. When first seen by Dr. Alt the anterior portion of the lens was opaque. The foreign body entered at the limbus and was localized low down in the anterior portion of the vitreous. The first few contacts of the magnet produced no response, but on the next contact the foreign body and seemingly the whole iris came away suddenly. The patient was seen for a time by Dr. Alt and then passed from observation May 8th last. July 17th, Dr. Hardy had seen the patient in the office of his associate, Dr. John Green, Jr., the man having been compelled to seek advice by reason of intense and unbearable pain. The ball was stony hard and vision nil. Enucleation was advised.

Dr. Lane of Chicago had informed Dr. Hardy of a case seen recently by him, making two unpublished cases to be added to the list. In Dr. Lane's case the lesion was caused by a blow from the fist.

In Dr. Hardy's opinion the salient points exemplified by Dr. Harbridge's case were, first, conservatism in advising enucleation following eye injuries; second, that traumatic aniridia is compatible with good sight in a small percentage of patients.

Dr. Francis Lane, Chicago, described the case referred to by Dr. Hardy. It seemed after the injury as though there must be iris behind the blood; but the case had been discharged a few days previously, and there was not a vestige of iris left in the eye. With tonometer readings every two days the tension never exceeded fourteen millimeters. It does not seem possible for glaucoma to supervene in these cases, because there is no chance for the formation of posterior synechiæ.

Dr. F. Park Lewis, Buffalo, remarked that Dr. Lane's case recalled one published by Casey Wood a few years ago, in which the tissues of the iris slowly disappeared after the injury; and another case seen by the speaker in which after rupture of the cornea there was atrophy of the iris, and the cornea was infiltrated with iris pigment. These abnormalities may well lead to a better understanding of the normal physiology of the eye than we can get from the eye in its normal condition.

Dr. W. H. Luedde read a paper entitled

Ocular Tuberculosis of Nasal Origin.*

No discussion.

Dr. Edward Jackson, Denver, read a paper entitled

Juvenile Recurring Hemorrhage, Massive Exudation, and Tuberculosis of the Retina.†

DISCUSSION.

Dr. Francis Lane, Chicago: Most of our present-day knowledge of tuberculosis has been acquired from experiments on the lower animals, by injection of tuberculin in the lower animals, etc. In the two thousand cases Dr. Lane had studied he had had no opportunity of describing a case of tuberculosis of the retina. Four years ago with Dr. Dodd he was able to describe a case of miliary tuberculosis of the iris with secondary involvement of the retina. In Axenfeld's eight or nine cases of tuberculosis of the retina the arteries were found plugged up and the bacilli were demonstrated histologically.

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*See page 69. †See page 84.

Dr. W. E. Gamble, Chicago, asked Dr. Jackson whether he had taken the vision immediately before giving the old tuberculin and a few hours after. Dr. Gamble had seen two cases in which there was a specific reduction of sight following injection, and lasting several hours, although no change could be demonstrated in the retina. In both cases the appearance was that of albuminuric retinitis. The exudate was present but became resolved, as in Dr. Jackson's cases. He felt that in these cases the changes in the retina were due to a toxic rather than a bacillary effect.

Dr. Edward Jackson (closing) stated that the vision had not been taken, as mentioned by Dr. Gamble. Most of the time the vision was greatly reduced by the presence of the vitreous opacity, being only 1/60, and he doubted very much whether the change would have been readily perceptible. As to the appearance of the optic nerve, Straub had quoted experiments in which tubercle bacilli had been injected into the vitreous, and in each case an exudate developed at the head of the optic nerve. Dr. Jackson had wondered whether his cases might not have experienced something of the same kind. The two cases were apparently healthy so far as pulmonary tuberculosis was concerned. But we should get away from the idea that we must have coughing and expectoration to have pulmonary tuberculosis.

Wm. H. Crisp,
Secretary.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Regular meeting, held October 18, 1915. Dr. Richard J. Tivnen, the president, in the chair.

Retinitis Proliferans Involving Both Eyes.

Dr. E. K. Findlay reported the case of a male, aged twenty-six years, who came under observation last May with the following history: In December, 1914, he consulted an optician on account of blurring of the sight of the right eye, and received glasses. A short time before he saw him he began to have blurring of vision of left eye and found difficulty in reading. Examination showed a slight divergence of the right eye. Right eye vision, 2/60; left eye vision, 6/15. In the right eye the ophthalmoscope showed areas of hemorrhage and the formation of new tissue of a bluish white color, with new formation of vessels. In the left eye the media were clear, but large retinal hemorrhages, more pronounced in the region of the disc, could be seen. A diagnosis was made of retinitis proliferans, or retinitis hemorrhagica hyperplastica, of right eye, and hemorrhagic retinitis in the left. A careful physical examination was made with negative results. There were no renal changes, blood pressure normal, Wassermann negative, and no reaction to the tuberculin test. The patient appeared in perfect physical condition. Treatment has failed in checking the course of the disease, and we find at present the vision is reduced in right eye to 1/20 —, left eye 3/60 —, with the formation of connective tissue in the left eye also, with certain areas of new blood vessels.

This condition was first mentioned by Mackenzie in 1864, and the name of retinitis proliferans was given it by Manz in 1867. Numerous cases have been examined microscopically—showing that the masses in the vitreous are connective tissue with newly formed blood vessels, and in most cases there is hypertrophy of Mueller's fibers.

Nearly all cases have resulted from hemorrhages in the retina, though some authors deny the necessity of hemorrhages. In this case hemorrhages undoubtedly preceded the disease.

Hemorrhagic retinitis is comparatively common, but this condition is seldom seen, so there must be another factor in producing this new tissue. In nearly all the clinical cases there was some local or general circulatory disturbance. This case presents the typical picture of retinitis proliferans with the etiology obscure. There have been no inflammatory changes such as iritis or cyclitis. Both eyes are involved and the disease has been progressive. Undoubtedly some toxic agent has caused a local disturbance of the retinal vessels and produced a socalled plastic retinitis.

Dr. Findlay, in answering questions, stated that the sinuses had been examined carefully with negative results, but no X-ray examinations had been made or pictures taken. Koch's tuberculin had been administered, up to two milligrams, without any reaction. Tuberculin treatment had been given for over six weeks, with no results. There was no hemorrhagic diathesis to account for the condition.

Discussion.—Dr. Suker stated that a condition of localized hemophilia might affect the retina. He himself had a case some years ago which showed a localized hemophilia in other portions of the body, but not in the retina. Such being the case, it may be possible that these hemorrhages into the retina in this case are of the hemophilic type.

Golf Ball Accident.

Dr. A. N. Murray said: A year ago the patient suffered an injury to the left eye, occasioned by a golf ball striking the eyeglasses which he was wearing. The upper lid was severely cut in a number of places; there was a ragged opening through the cornea near the nasal limbus, with prolapsed iris, and an opening into the sclera three or four millimeters long, about three millimeters from the nasal limbus. He abscised the protruding portion of the iris. A week later a piece of glass, two millimeters long and about one millimeter thick, was found embedded in the cornea, just below the center and flush with the surface, having been present this length of time without having produced any symptoms whatsoever. In the meantime the lens had become totally cataractous, flocculent lens matter almost filling the anterior chamber. In attempting to remove the glass it prolapsed into the anterior chamber, and was extracted by lifting it up on the point of a keratome and seizing it with an iris forceps inserted through its wound in the cornea. Its position was determined by oblique illumination and contact with the keratome. The cataract absorbed in five or six months, when it was possible to see clear inside of the capsule, owing to its attachment to the inner surface of the cornea at the site of the perforation. The attachment of the anterior capsule to the cornea was severed with a Knapp knife needle, and the posterior capsule needled so that a good opening was secured. Vision of 20/24 is obtained with a plus ten sphere. The patient is now wearing this sphere before the other eye; with this very unusual combination he apparently obtains binocular vision. This is not constant, however, owing to a convergent strabismus of the injured eye which developed soon after the injury and is still present part of the time. At first marked diplopia was present; it is now noticed only when the left eye converges. A very fine splinter of glass, visible only with the loupe and oblique illumination, is still embedded in the corneal tissue at the nasal limbus, with exudate behind it, but the condition apparently causes no irritation. It does not seem wise to remove it at present. The corneal scar is very irregular. There is no astigmatism present, although there was quite extensive scarring about the cornea.

In answer to a question the doctor stated that there is no involvement of the ciliary body.

Discussion.—Dr. W. H. Peck, in discussing the paper of Dr. Murray, said he thought it was advisable to have an X-ray picture taken when splinters of glass had penetrated the eyeball, as thereby unsuspected pieces might be found, the pieces of glass in some cases being opaque to the Roentgen ray, according to their composition and size and distance from the piece of glass and the X-ray plate. Unfortunately glass is not magnetic, and so not amenable to removal by the magnet, as in the case of iron and steel. Even if pieces of broken glass are located in the interior of the eye, it is a very serious problem to remove them, and frequently impossible, as in the case of other nonmagnetic bodies, such as copper, lead, wood, etc.

Dr. Suker asked whether, with the great difference in refraction and having binocular vision, an attempt had been made to determine whether there was superimposition of the images.

Dr. Murray replied that no such attempt had been made.

Dr. Suker inquired if it might not be possible that the patient has a suppression of one or the other images, which might thereby simulate binocular vision.

Dr. Murray responded that he had simply assumed that the patient had binocular vision.

Dr. Murray, in response to another question, stated that the patient does not notice that he sees double when fatigued.

Dr. H. S. Gradle says that it does not seem possible that this patient could have true binocular vision with a dioptric difference of at least twelve diopters in the two eyes. In such a case binocular vision would not be likely to be present, owing to this dioptric difference and to the subsequent difference in the size of the retinal images, but stereoscopic vision might be present, and the optical axes might be parallel.

Dr. Murray, in answering questions regarding binocular vision, said he had not made all the tests possible to determine this matter; that the patient did not have any difference in the size of the retinal images; that these various tests with reference to binocular vision will, however, be made by him. With the exception of this one sliver of glass, there does not seem to be any glass in the eye now. There has been no photophobia nor irritation during the entire year. No effort has been as yet made to determine whether the patient has accurate depth perception.

Dr. Willis O. Nance said that five years ago he had reported to this society a case of injury to the eye by a broken spectacle lens. The literature at that time showed only two or three such cases. They have been, however, reported somewhat more frequently since then. Injuries to children from broken glass lenses seem to be exceedingly rare, considering the number of spectacles worn. The speaker inquired what experience the members of the society have had in locating glass by means of the X-ray. Dr. Nance had understood that the diamond throws no X-ray shadow, where ordinary glass does. The speaker said that he personally had had no experience in making such location.

Dr. Tivnen said that Potter and others say that whether glass in the eye can be seen by the use of the X-ray depends upon the composition of the glass. Sometimes it becomes a medicolegal question of importance, whether an X-ray examination should have been made. In any event, it was a good safeguard. Generally speaking, the localization of glass in the eye by the X-ray is very disappointing.

Dr. Michael Goldenburg reported the case of a piece of steel or iron having entered the eye some ten years previously. He first saw the case about six years ago, when he noted the piece of metal lying flat upon the anterior surface of the iris. The metal could be plainly distinguished from the surrounding tissue by its stationary position and the contraction and dilatation of the iris around it. He saw the case again two months ago, and there was absolutely no sign of the metal ever having been present. Whether it had become covered by the iris pigment or what the manner of its disappearance was, was unknown.

Dr. George F. Suker strongly deprecated any attempt to remove the small remaining splinter of glass, because this glass is undoubtedly lead free and nonirritating, and will not corrode. Also because the glass has become so well encapsulated and is immobile, and its location also precludes mobility and traction upon it, and finally there is no evidence of irritation. The exudate is probably thoroughly organized by now. Unless symptoms of irritation should appear, interference should not be undertaken.

Dr. M. H. Worthington said he had had a case of injury to the anterior surface of the cornea in a patient who was injured while playing tennis, by the lens of his glasses being struck and broken by a tennis ball. The speaker also referred to the case of a young man who had received cuts on his cornea from broken glass caused by a missile being thrown through the window of a street car on which he was riding, and the former case he had reported. He believed these cases to be extremely rare.

An Obscure Clinical Case.

Dr. M. H. Worthington stated that the case he had intended to present was probably one of vernal catarrh, but as this case had disappointed him he would report a case that was of interest to him on account of the numerous outbreaks of inflammation in a pair of diseased eyes that had been under his observation for several years.

The patient, a young woman, was fifteen years old in 1909, when he first saw her. She was anemic in appearance and of a strumous diathesis. Scars on the side of her neck showed the remains of suppurating cervical glands. Her mother was well and healthy, but her father was not strong, and at present is confined to his bed with pulmonary tuberculosis. At that time she had a double keratitis, which was diagnosed as interstitial, but which he now believes to have been tubercular. After several months' treatment this quieted down, leaving nebulæ and vision of 20/80 in each eye, but no remnants of vessels to be seen in the corneal tissue under the loupe.

The patient was not seen by him again until 1913, although she stated that during that interval she had suffered recurrent attacks of keratitis in both eyes.

At this time she has several fresh spots in the corneal tissue and eyes highly inflamed.

In September, 1913, she had a fascicular keratitis in her right eye which had to be cauterized before healing took place. In the following year she had phlyctenular keratitis in the left eye.

The patient was seen again in August, 1915, when she had an inflammation in the right eye, a swelling or nodule at the temporal side of the corneoscleral junction in the sclera, and a typical episcleritis. This condition has improved slowly.

The speaker inquired whether any of the members present had had any experienec with guaiacol as a subconjunctival injection in these cases, in aqueous solution 1/100, stating that he was disposed to make use of it in this present case.

Dr. Tydings said that he had had no experience with guaiacol, but that there had been marked improvement in one case under his observation, of pyorrhea alveolaris with episcleritis, by the use of a proprietary preparation.

Dr. Worthington stated that he had examined the patient's teeth, and had referred her to her dentist to ascertain if she had any signs of pyorrhea, but he had reported back that he found nothing of that nature. A Wassermann made some time ago was negative.

Dr. Tydings responded that the dentists did not often recognize pyorrhea until it was too late to do anything for it. And that he would rather accept the diagnosis of a microscopist than a dentist.

Dr. Murray referred to the case of a man taking large doses of digitalis who developed purple vision. His vision became normal upon the cessation of the administration of digitalis, but upon resuming the digitalis the vision again became purple. Yellow vision caused by the use of santonin is not uncommon, however.

Tubercular Choroiditis.

Dr. Tydings reported the case (presenting the patient) of a young man, twenty years of age, whose father had died of kidney trouble at the age of forty-eight years. The mother is living and in good health. Two brothers and one sister are living. There is no disease history. On the 28th of July this patient came to the speaker's clinic blind in the left eye. There was light perception but no vision. Examination showed neuroretinitis, choroiditis, two patches, and what seemed to be a sarcomatous growth in the superior temporal quadrant of the left eye. He was advised to enucleate. The speaker said he would have recommended enucleation if the growth had stood alone. There is considerable doubt as to the etiology. The urinary findings were negative; there was no appearance of inherited lues; the Wassermann test was negative. There is only a feeble response to the tuberculin test, there being a rise of one and a half degrees of temperature under the test. The nasal septum was deflected to the left. The left sphenoid was not healthy. The walls were denuded and the bone was exposed. The septum was straightened, an opening was made up to the sphenoidal sinus, and the patient was put on active specific medication and tuberculin injections. There has been good progress; there is now 20/160 vision in this eye, and the other is perfectly normal.

The speaker stated that he believed this condition to be of tubercular origin, although he was not sure.

Discussion.—Dr. W. A. Fisher said that he had seen this same patient about a month ago, and that the condition then was no more interesting than now, because there has been such marked improvement in the condition of the eye since he first saw him.

The condition tonight looks much like many cases of choroiditis we see. There is a pigmented choroidal spot just below the fovea centralis above the fovea and a little toward the temporal side, there is an atrophic spot in the choroid. There is no swelling of the spot, but when he saw him with

Dr. Tydings on August 2, 1915, this white spot was ten times larger than it is tonight, and elevated from the normal part of the fundus about four diopters. It presented at that time a picture of a sarcoma of the choroid, and reminded him of a picture he had for teaching that is copied from Frost's Atlas. He did not have any vision at that time, and he believed it to be a sarcoma. This picture (August 2, 1915) and the one shown tonight, makes the case one of very great interest.

Dr. H. S. Gradle said that in this case at one time there was probably some interference with the circulation of this area, with subretinal or subchoroidal hemorrhages, and a collection of serum. An autolytic process involving the retina and the choroid probably followed. Now the condition is one of atrophic retina, with the sclera showing through. There is still some swelling of the surrounding area. We cannot tell whether the central area is swollen, but elsewhere there is edema. The condition now is what might be designated as a hole in the retina and choroid due to autolysis from the subretinal collection of serum.

Dr. Michael Goldenburg said that in view of so much destruction of the retina and choroid, and so little pigment epithelium or choroidal pigment being present, one would be led to think of what von Michel said, that where there is great destruction of tissue, with little or no pigmentation and few changes in the vessel walls, the condition can be safely diagnosed as tubercular. In view of the fact that Dr. Tydings' injection of tuberculin was followed by a rise of one and a half degrees, this would seem to be good grounds for regarding the condition as tubercular.

Dr. Tydings, in closing the discussion, said he believed the condition to be tubercular, but at the same time he had not felt like abandoning specific treatment. The patient began to complain on the twenty-fourth day of July, and the speaker saw the case four days afterwards. The sudden blindness was ascribed by the speaker to the swollen disc. The speaker declared himself to be open to suggestions as to what the condition is.

A Double West Operation.

Dr. John A. Pratt, of Aurora: While in Seattle, last July, I demonstrated the West operation on the patient for a number of physicians. The patient's brother, who is a physician, operated the other side the following day. The patient received four or five treatments, and then was allowed to return to his home on the farm, about one hundred and fifty miles distant.

The results of the operation were seemingly good—so good that three weeks ago the patient was sent to Dr. Fisher of Chicago for a cataract operation.

Dr. Fisher found on microscopic examination that pus was present, and hearing from the patient that I had performed the West operation on him, sent him out to Aurora to have him cleaned up. After three weeks' treatment the eyes seem clean and the tears are carried off, but upon microscopic examination pus is still present in the secretions of the eyes. The question is whether to send this patient back to have the sac trouble cleaned up, if possible, or destroy the sac, and perform the operation for cataract. The patient has only one eye and is thirty-five years old.

Discussion.—Dr. Pratt, in answer to a question, said that there was no pus to be seen by the eye, and that the tears drained into the nose.

Dr. W. A. Fisher said that this patient has only one eye, has 20/120 vision and a cataractous lens, and had been referred to him for an intracapsular cataract operation.

He had an intranasal operation to drain the tear sac, and there was pus in the conjunctival sac one month ago, when he came for the cataract operation. He has since received daily treatment, and today pus is found in the conjunctival sac. The nasal operation as performed would be considered a success providing the lens was not opaque, but the question of infection in the only eye he has is a very important one.

He believes the case should have more treatment and that the operation should not be censured, because a tear sac operation is not always successful.

He has seen many operations of this kind presented to this society lately, and Drs. Pratt and Clarke have given excellent papers upon this operation, and he believes we would all be benefited by looking further into the subject rather than censuring it.

Dr. Pratt, in answer to a question, said that there was very little discharge; that the tears escape, and that there is practically no discharge.

Dr. Tivnen inquired what would be the objection to tying off the canaliculus.

Dr. Pratt responded that he saw no objection to it, although it is slit clear up now. The sac may, however, be injected with trichloracetic acid.

Dr. Tivnen said that he felt the removal of the sac would be justified.

Dr. Tydings said that he had had a similar case, where the pus sac did not clear up for three or four months. The pneumococcus and the streptococcus predominated. The sac was extirpated.

Dr. Goldenburg said that he had seen several of these cases in Berlin which were performed by the originators of the operation and were considered beautiful results. They were just as good as in this case; but the most serious phase of a dacryocystitis is the pus that is retained and the virulence of that pus, and the danger to the eye of a serpiginous ulcer or an acute phlegmon, and as long as there is any pus there at all, there is always that danger present. The control of the epiphora is not a serious matter at any time, but the serious matter is the control of the pus. The speaker said he would strongly suggest that the sac be removed according to the method of Dr. Mueller of Vienna.

Regular meeting, held November 15, 1915. Dr. Richard J. Tivnen, the president, in the chair.

Treatment of Obstruction of the Lacrimal Passages, Including Destruction of the Sac, With Trichloracetic Acid.

Dr. Harold Gifford, Omaha, Nebraska, first referred to his previous contribution on this subject, then described a number of points in lacrimal technic. Formerly, in destroying the sac, he generally put the patient to sleep and used the Paquelin cautery to destroy the lining, but he had some fear that if he used the cautery vigorously enough to be sure he destroyed all the sac, he might cause a little necrosis of the bone and have future trouble.

Many years ago the sac was destroyed with chlorid of zinc placed on a piece of cotton and stuffed down into the sac, waiting for nature to do the rest. Seemingly good results were obtained by that method. However, it was inaccurate and painful, so that he had now adopted the method of destroying the sac with trichloracetic acid.

Discussion.—Dr. H. W. Woodruff said he had used the method of Dr. Gifford, and thought he was safe in recommending it in cases of acute exacerbations of chronic dacryocystitis in which the surrounding tissues were greatly inflamed, and in which it was almost impossible to extirpate the sac. Sometimes one could not tell where the sac began or ended. In such cases he thought the Gifford operation ideal, because it was simple and effective. He was not, however, quite prepared to give up the extirpation of the sac in cases of chronic purulent dacryocystitis in which it was very essential to get rid of the pus sac previous to doing an operation for cataract, and he thought he would still adhere to the method of extirpating the sac.

As to the treatment of dacryocystitis in infants, he agreed with Dr. Gifford, except that he had never adopted the external incision in probing the nasal duct by that method. He had had a number of cases that were relieved and cured by simply syringing the sac and duct. Putting the child under the influence of ethyl chlorid and inserting the point of a syringe in the punctum, and with one squirt the fluid in the syringe seems to go with a gush through into the nose, and that was the end of the dacryocystitis.

Dr. J. Sheldon Clark, Freeport, Illinois, expressed himself as much interested in seeing Dr. Gifford perform the operation on a tear sac earlier in the day at the clinic held at the eye and ear infirmary. While the technic was simple, yet the operation should be done with care.

It was his opinion that the technic as given would be suitable where one had for his object the destruction of the sac. But in this, as in the Meller excision procedure, one does not have a functionating tear apparatus left.

The Toti operation was mentioned by the essayist, and the point made that the opening made from the outside into the nose was prone to close off, due to the deposit of fibrin around the bony opening. Dr. Clark was of the opinion that the intranasal route still offers the best way of attacking the floor of the lacrimal fossa in all cases where one desires a functionating tear apparatus following the operation, and that this is the best way of securing drainage. By the intranasal route one can secure a good opening with clean cut margins of mucoperiosteum, and when this is done and the after-treatment persisted in for a time, a closure does not take place.

Like Dr. Woodruff, in children, and especially in young babies, he had been able to cure cases of blennorrhea with a simple syringing of the lacrimal passages.

Dr. J. A. Pratt, of Aurora, thought that oculists should tend towards preservation in these cases as much as possible, and he thought that was the trend of Dr. Gifford's remarks.

In reference to anesthesia in passing the probe, since he had been doing the West operation he had packed the lateral wall of the nose before passing the probe. This would deaden the bone and relieve the patient of much pain. With the West operation he had had some successes and some failures, and it seemed to him that a great deal depended upon the patients themselves. In cases of phlegmon the intranasal operations gave direct drainage into the nose. Free and good drainage tended possibly towards more rapid healing, so that one could do more conservative operations.

Dr. William A. Mann asked Dr. Gifford whether in these simple cases of obstruction he had ever used the galvanic current. Personally, the speaker found it a great advantage in passing the probe to connect it with the negative pole and applying from ten to fifteen milliamperes. The probe would pass more easily than otherwise.

Dr. Oliver Tydings had tried the various methods, but was heartily in favor of using the probe where there was a tear sac that one could pass it through. He had had some experience along the line mentioned by Dr. Mann. In very many of the cases, as long as the stricture was fibrous tissue and not bone, electrolysis would work very well. One had practically the same condition to contend with that he had in a urethral stricture. He had bulb pointed bougies made for this purpose, and he had used them, but unfortunately in many of the cases we had to contend with bone rather than fibrous tissue.

Dr. Oscar Dodd was glad he had seen Dr. Gifford perform the operation he had described, and the only question in his mind was to follow up the cases and know what the results were. Inasmuch as Dr. Gifford had had a large experience in this line of work, he expressed the hope that he (Dr. Gifford) would speak further on the subject.

Dr. Gifford, in closing the discussion, said he had never tried electrolysis in connection with probing. When he first got the idea of using electrolysis, he was afraid to try it lest he might get more cicatricial contraction. Electrolysis meant a certain amount of decomposition of tissue, but whether the ultimate result would tend more towards the formation of stricture than one would otherwise have, he did not know.

With regard to the intranasal operation, one could combine the idea he had suggested of shoving through the membrane of the sac into the nose with the intranasal operation. All one had to do after making the intranasal opening was to make an external incision through both walls of the sac and shove gauze through into the nose. The scar produced would be imperceptible. He believed some method of covering up the edge of the bone would lead to more permanent results in all operations for making a new hole into the nose.

He had never had the experience related by Dr. Woodruff, of curing these cases with a single syringing of the sac.

As to the after-treatment of this method of destroying the sac, it did not amount to anything. All one had to do was to pack the cavity with some aristol, merely to keep the cavity from filling up with tears, and keep a little zinc oxid ointment on the opening in the skin. The granulating cavity left by the trichloracetic, unless it were filled with powder or the sides kept pressed together, might tend to fill with pus. In one case of mucocele he had that thing happen. The mucocele was as large as a pigeon's egg. The woman returned two weeks after the acid had been used, with the pocket dilated with pus. He let out the pus and pushed the walls together with a wad of cotton on the outside, kept a bandage on to hold the edges, and the thing closed up.

Some Observations on the Operation of Iridotasis for Glaucoma.

Dr. Dunbar Roy, of Atlanta, Georgia, stated that the only advantage in the iridotasis operation was the avoidance of a possible hemorrhage into the anterior chamber, which might occur in either of the two other operations. In the simple non-inflammatory forms of glaucoma the use of cocain as an anesthetic was all sufficient.

After reporting five cases in which he had done this operation, he said there was no universally ideal operation for glaucoma. Each ophthalmologist had his own special technic, which he considered the best for this class of cases. He believed that most men were agreed that nothing short of some well recognized operative procedure should be attempted in those cases of acute fulminating glaucoma. Personally he had discarded the use of miotics except as an adjuvant, for he believed in immediate operation in every case of well recognized acute and chronic glaucoma.

There were good arguments favoring the use of this operation. 1. Its simplicity and ease of technic. 2. The immediate result in relieving all the symptoms was just as permanent as that obtained by any other operation. 3. Freedom from irritation in the healing of the eye.

Discussion.—Dr. Casey A. Wood said all were interested in the Borthen operation, as it touched a probable cure for chronic simple glaucoma. Almost any operation would cure a case of glaucoma in which acute attacks occur, but in cases of slowly progressive, simple glaucoma we have a much more difficult problem to deal with, and it seemed to him that the operation described by the essayist was the simplest and perhaps the most satisfactory method of dealing with this formidable disease.

He had one practical suggestion to make in connection with the operation itself, based on his own experience.

Owing to the screen of conjunctival flap, it is not easy to pass an iridectomy forceps into the anterior chamber through the small opening called for by Borthen and required for success in this operation. Fortunately, this part of the procedure is not necessary if one, in withdrawing the keratome, press upon the posterior lip of the wound. A gush of aqueous follows pressure against the posterior surface adjoining the scleral wound, and with the flow of fluid the iris margin and the intermediate iridic zone are carried out through the opening. After this has been done one finds the iris in the position desired. In carrying out Borthen's ideas it is now necessary to grasp the iris and pull it up still farther (which constitutes the required "stretching" of the iris) and well outside the incision.

Dr. N. Remmen called attention to Borthen's article which appeared about four years ago, in which he (Borthen) described his first operation, which was an accident. He was going to do an iridectomy for glaucoma in a child. He made an opening with the Graefe knife, and suddenly there was considerable expulsion of the iris and vitreous, and he thought the whole eye was lost. He bandaged the eye and sent the patient home. The patient was not seen again for about two months, at the end of which time the patient returned and, to the great surprise of Borthen, the eye was almost perfect.

Dr. Remmen said the reason why oculists did not pay much attention to the operation at the time was that Holth had performed iridencleisis, and it was thought to be about the same thing. In connection with the operation as described by Dr. Roy there were points of undoubted value. In the first place, pulling or stretching the iris opened up the spaces of Fontana. There was also possibly some filtration. The stretching of the iris may keep the space of Fontana open permanently in the nighttime as well as in daytime. Tension was higher at night, and there was no other operation that would do this as well as this one would. It might infrequently happen that no hypertension in a glaucoma patient could be found in the daytime, because of daylight contracting the pupil, but if the patient was put in a dark room for two or three hours and the pupil allowed to dilate, we would be able to find increased tension.

As to the use of the tonometer, he thought it was of great importance. For example, he had a patient about a year ago who was blind in one eye. He looked at him hurriedly and thought it was a case of atrophy. The patient had been treated by an able physician for atrophy and no operation was done. The sight began to fail in the other eye. The speaker glanced into that eye and saw slight paleness of the disc. Vision was still nearly normal, and he began to think of the cause of the atrophy. Meanwhile, he thought he would take the tension, and to his surprise found it was nearly fifty. With palpation it seemed practically normal. Miotics did not reduce the tension. He did trephining and got a very good result. He thought trephining would still be considered a good operation. He recalled four cases of glaucoma in which everything else had been tried but trephining, and this operation gave a very happy result.

Dr. Wesley Hamilton Peck expressed himself as being greatly impressed with the good features of iridotasis because he had been following the results of the Elliot operation and had found a number of cases of late infection, but there was a striking absence of infection in Borthen's cases.

In one of the operations performed by Dr. Roy at the infirmary the iris retracted into the anterior chamber, and it was claimed by Borthen that by using atropin this could almost certainly be avoided. Dr. Roy had to draw the iris out again. Dr. Peck could not see any objection to using atropin, and judging from Borthen's results it would be better to use it. Another good feature was the continued reduction of tension. According to Borthen, palpation with the fingers was practically valueless; that he had practically discarded it and now used the tonometer. Borthen did Holth's operation for a number of years. Cases of injury in which there was incarceration of the iris he noticed were followed by permanent reduction of the tension, and this led him to try stretching of the iris, and Dr. Peck believed this operation was going to become popular from almost every point of view. Very few operations had been recorded in the literature in which the results had been so uniformly successful.

He was impressed with the absence of infection in the cases reported by Dr. Casey Wood in his modification of the Zorab operation, and this tends to confirm the greater safety of iridotasis over trephining. Several of his professional friends had told him that they had practically given up trephining on account of the many cases of late infection. In cases in which there was atrophy of the iris, it was practically impossible to do iridotasis.

Another point of importance was to make a very small incision, otherwise the iris was almost certain to retract into the anterior chamber.

Dr. Harold Gifford, Omaha, Nebraska, asked Dr. Roy whether there was a bleb after iridotasis, the same as after trephining.

Dr. Roy replied there was a fairly good bleb.

Dr. Gifford, referring to the cause of detachment of the choroid after trephining, said it was much more frequent than after any operation unless it be the Lagrange. One did not appreciate how often this occurred unless he followed Elliot's advice and used atropin regularly after the operation. In his early cases he was afraid to use atropin after trephining. After he began to use atropin systematically and looked especially for detachment of the choroid, he found he had a number of such cases. In one case he had a double detachment of the choroid, one sticking out into the pupil from each side. Detachment of the choroid was an unpleasant looking thing, and although ultimate recovery was said to be invariable, he did not think the man's sight was as good as it would have been if he had not had it. Some attributed the frequency of these detachments after trephining to the sudden loss of fluid; others to a traumatic connection between the anterior chamber and the perichoroidal space. Both theories were wrong; otherwise it would be more common after cataract operations. The true explanation is to be found in the long continued low tension after the trephining. The occurrence of the bleb after iridotasis showed that the reduction of pressure was due, not to stretching the iris nor to freeing Fontana's spaces (which it evidently cannot do), but to the formation of a fistula.

Dr. H. W. Woodruff spoke of a man who came to the infirmary last April with the history of having had an iridectomy performed on his right eye about eight years ago. This was without result, as there was an entire loss of vision so that he had no perception of light. When he came he had practically no vision in the remaining eye. The patient could see the movement of the hand in the lower outer field, but could not count fingers. Operation was suggested. The man objected to it, stating he had had such an unfavorable experience with the other eye that he did not want to have any other operation. Eserin was used, and much to the astonishment of Dr. Woodruff vision gradually improved until a month ago the patient had 20/80 vision in that eye. The man was able to get about, and Dr. Woodruff said he was certainly thankful he did not operate upon that eye.

Dr. Frank Allport contended that glaucoma in a large proportion of cases was an expression of a general condition, and he always insisted upon an absolutely thorough general examination of the patient. He believed a great many cases of glaucoma can be relieved by a proper diagnosis of a general condition, and the relief of such conditions by appropriate treatment, together with the use of miotics. He hardly believed that Dr. Roy would advocate invariably the performance of any kind of operation upon the eye immediately he made up his mind that a glaucomatous condition existed.

With regard to the operation described by Dr. Roy, he had not performed it himself, but he intended to do so when an opportunity presented. Ophthalmologists were very much in the dark as to what they wanted to do in glaucoma. The present operations were not by any means satisfactory, and ophthalmic surgeons had passed from iridectomy to various other procedures, such as the Lagrange operation, the Elliot operation, etc. The Elliot operation swept over the world like a cyclone a short time ago and everybody was doing it. The returns were now coming in from the Elliot operation. Late infections were reported, and a great many were abandoning the operation. If one could get results from such a simple operation as the one that has been described, why not perform it? The Borthen operation appealed to him exceedingly, and he was going to give it a thorough trial.

Dr. Francis Lane thought the success of the operation was due to the fact that the iris being spongy tissue it afforded ample opportunity for a cystoid cicatrix to form, and thereby take care of drainage beneath the conjunctiva.

Dr. George F. Fiske had never seen a case of glaucoma treated by miotics alone that recovered. He had seen patients on whom two or three or four iridectomies had been performed keep vision of from 20/20 to 20/30 for from twenty-five to thirty-three years. Personally, if he had glaucoma he would be operated on at once; would have his general health attended to, and miotics used the rest of his life.

Dr. Roy, in closing, said he had been misunderstood with reference to the use of miotics. When he found miotics were doing no good and the symptoms were getting worse, it was a question of operation, and he used miotics as an adjuvant after operation. He had not used atropin after operation. He had never had an iris slip back into the anterior chamber in any case he had operated on.

Skin Grafting—The Use of Vaselin in Cutting and the Open Air Treatment.

Dr. Walter R. Parker, Detroit, Michigan, stated that after the surface had been prepared the skin and knife were smeared with a thin coating of sterile vaselin. By this means the tendency of the skin to move with the knife was practically eliminated, and one of the greatest difficulties in the successful cutting of grafts thereby obviated. As all his experience had been in correcting defects in and about the eyelids the grafts had been small, varying in size from twelve to twenty-five millimeters to twenty-five to fifty millimeters. He could not see, however, why the same advantage would not obtain in grafts of any size. So far as he had been able to judge, the use of vaselin had not interfered with the healing process in a single case, nor had he seen a complication he could attribute to its use. His experience included twelve operations.

Discussion.—Dr. Oscar Dodd had used vaselin on the knife to start the incision so that it would not stick to the skin. He had always cut the grafts dry and applied them dry, but Dr. Parker's method of applying vaselin on the knife allowed it to slide through and make the incision better than he had been able to do.

Dr. Harold Gifford had never tried the use of vaselin, but was going to do so after what Dr. Parker had said. An opening dressing was good but not essential. If one put vaselin and aristol on wet cotton, and after covering the latter with gutta percha, to prevent drying, put on a firm dressing, the graft would never peel off. He had always been able to stop the bleeding by pressing the flap firmly down on the raw surface.

Extraction of Cataract, Leaving an Undetached Conjunctival Flap or Bridge on the Temporal Side—Its Advantages.

Dr. Frank C. Todd, Minneapolis, Minnesota, said his experience was limited to seventy-one operations in which this incision was used. The advantages over the use of a suture are obvious. The greatest advantage may be summed up in the word safety. It often happens after or during a cataract extraction, and before the eye is closed, that the lid winking over the eyeball catches on the lower lip of the wound, thus turning it over and outwards, sometimes permitting of the escape of vitreous, or at least interfering with the proper coaptation of the two edges of the wound, thereby endangering infection of the wound and vitreous when the edge of the lid, so difficult to sterilize, rubs against the inner surface. This cannot take place when the conjunctival flap exists, for the lid rides safely over the attached conjunctival flap and the cornea. There is less danger of escape of vitreous, and he has had a number of cases in which no vitreous was lost, or where a little vitreous presented, in which he is confident a serious loss of vitreous would have occurred were it not for the presence of the conjunctival flap, and it proves a safeguard of especial value in unruly patients.

As to visual results, the number of cases is not sufficient to draw any definite conclusions, but both in the University Hospital cases and in private practice he finds that the average of visual results were better in the cases where the flap was undetached than was the case where the conjunctiva was detached. His experience leads him to believe that an undetached conjunctival flap is a procedure of preference in cataract extraction.

Discussion.—Dr. William A. Fisher thought that if the members of the society would take a vote, it would be to the effect that loss of vitreous was one of the most serious complications one could have during an operation, and if the flap described by Dr. Todd would keep the vitreous back, he had contributed a very valuable addition to the cataract technic. Loss of vitreous after the lens was born was of little consequence in any method of extraction if the lids were kept away from the eyeball, but loss of vitreous preceding the delivery of the lens was a serious matter to most operators. He thought that methods of removing the lens when vitreous had preceded it should be emphasized, and much attention should be given to the pressure that might be given to the eyeball through the lids.

He was pleased to note that Dr. Todd did not remove the dressings for four days. If all has gone well after a cataract operation for four days, it is safe to say that there would not be any objection to waiting four or five days more and allow the wound to heal more strongly. Dr. Todd is to be congratulated upon his uniformly good results, but he believed Todd could extract many of his lenses in capsule, providing he would try the pressure before rupturing the capsule. If there was prolapse of the iris, he did not think it should be cut off until fourteen days after the operation, on account of the danger of opening the corneal wound and inviting infection. When the prolapse is cut off fixation forceps should not be used, because a sudden movement of the eye caused by the pain might open up the corneal wound and invite infection. If the eye is not dressed for nine days, infection will be rare.

PAUL GUILFORD,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Regular meeting, held October 16, in Denver. Dr. C. A. Ringle, of Greely, presiding.

Dr. Edward Jackson presented the society with a copy of Dr. Julius Hirschberg's "American Ophthalmologists," with the author's compliments.

The society decided to hold another ophthalmological congress in Denver in 1916.

Secondary Glaucoma.

Dr. G. F. Libby exhibited a man, aged thirty-seven years, who sixteen years ago had a piece of steel in the left eye, which, at the request of another doctor, Dr. C. E. Walker had extracted by means of the magnet. Prompt healing with no inflammatory reaction followed. Vision of the eye has gradually failed since accident. Two months ago glaucoma developed suddenly, and there is at present only light perception, an opaque lens, exudate in the pupillary area, and extensive posterior synechiæ. X-ray negative. Question: What is best to be done?

Discussion.—Dr. C. E. Walker stated that he had no recollection of the case, but with regard to the present condition thought that it might be well to remove the lens.

Dr. Melville Black thought the suggestion to remove the lens a good one, and advised such course.

Dr. E. T. Boyd said that if there were any operations the result of which the doctor would like to examine microscopically, it would be well to perform them upon this eye, as in his opinion it would be but a short time until opportunity for such examination would be presented.

Dr. Edward Jackson observed that such cases do occur in which the eye quiets down, and suggested the use of eserin.

Dr. Libby replied that miotics had been and were being used.

Two Cases of Partial Albinism With Congenital Nystagmus.

Dr. W. F. Matson presented Nettie V., aged eighteen years, with lateral and rotatory nystagmus; irides gray. Right eye, vision 20/45 w. plus 1.60 combined — 4.00 ax. 5°; left eye, vision 20/40 w. plus 2.50 com. — 2.50 ax. 175°.

Homer V., aged twelve years. Congenital horizontal nystagmus. Right eye, vision 20/45 w. plus 3.00 com. — 3.25 ax. 180°; left eye, vision 20/35 w. plus 0.75 com. — 4.50 ax. 180°.

The two are brother and sister, of a family of eight children, the rest of whom are normal. Family history negative. These children are well advanced in school for their ages.

Discussion.—Dr. Black said that he had found that some form of colored lenses gave better results than clear ones in these albinotic cases.

Dr. Libby remarked that the advancement of these children in their school work proved the incorrectness of the supposition that those so afflicted were dull. In these cases of partial albinism, as years go by, more or less pigment deposit takes place with consequent improvement.

Dr. Jackson said that he had had a case of a partial albinotic child in which the father, in early childhood, had been the same, but at the age of thirty-five would not be so classed—much pigment had been deposited, the hair at this time being brown.

Dr. A. C. Magruder stated that four days ago he saw a case in a boy of seven, about like those shown by Dr. Matson. This boy had been wearing correction of + 2.00, but under atropin accepted + 2.00 ○ + 1.50 ax. 180° with great improvement.

Dr. W. L. Hess saw the girl shown by Dr. Matson seven years ago, and now notes marked improvement in the appearance of the eyes, vision and nystagmus.

It was brought out in the discussion that notwithstanding the absence of pigment, greatly impaired vision and violence of nystagmus, these cases sometimes make wonderful improvement, hence a guarded prognosis had best be given.

Removal of Tarsal Cartilage With Overlying Conjunctiva for Trachoma.

Dr. D. A. Strickler presented a young man who had had trachoma five years and who had come to him with perforating ulcer of the cornea. Dr. D. H. Coover had seen the case with him, had suggested and removed the tarsal cartilage with overlying conjunctiva, to the great relief of the patient and improvement of the corneal ulcer. There were some granulations at the site of the operation, and Dr. Strickler wished to know what, if anything, should be done with them.

Discussion.—Dr. Black said that he had seen Dr. Fox of Philadelphia remove the tarsus with conjunctiva. It is a much simpler operation and followed by more rapid recovery than the older one of ordinary excision with preservation and suture of the conjunctiva, which causes great reaction and slow recovery.

Dr. E. R. Neeper had had no experience with this particular operation, and spoke of Dr. Weeks of New York and Dr. Beard of Chicago being opposed to excision of the tarsus.

Dr. W. H. Crisp referred to a patient in whose case excision of the tarsus was performed by Dr. Wood of Chicago, at the County Hospital a year or so ago, and said that no benefit resulted; nor was there improvement until Dr. Bane operated upon the nose.

Dr. Walker suggested that the tarsus be removed from the cutaneous side and leave the conjunctiva intact.

Dr. Boyd raised the point that if it could be done as well or better from the under surface, was it not advisable to avoid skin incision because of the tendency to keloid formation about the eyes?

Dr. Walker did not believe that keloid was more prone to appear here than elsewhere.

Choroiditis.

Dr. E. F. Conant presented Mrs. M., aged twenty-two, who says that she first noticed failing vision of the right eye two and a half years ago. No disease of the left eye which, under homatropin correction, reads 18/13 w. + 0.75 ◯ + 0.25 ax. 90°.

Patient denies syphilis. In July last she had a miscarriage at three months, which she says was due to and immediately followed a fall sustained by her at that time. Urinalysis negative. Vision of right eye at first examination 18/24, and four days later 18/20. Ophthalmoscope reveals hazy vitreous with floating opacities and very obscure disc. Small atrophic patch and small area of pigmentation near macula.

Discussion.—Dr. F. R. Spencer asked as to the examination of the nose and Wassermann. Thought the condition undoubtedly specific.

Dr. Black thought it remarkable that the woman could see so much when so little could be seen with the ophthalmoscope.

Suggested that the sinuses be examined and Wassermann made, but believed it to be specific.

Dr. W. C. Bane said that it was a nice case to demonstrate the value of the indirect method by which the fundus was clearly seen.

Partial Circumcorneal Congestion.

Dr. W. H. Crisp presented Mrs. A., aged thirty-nine years, who gave a history of repeated attacks of redness of the right eye, fugitive in character; until the last two or three months it has been constant. No special pain. Near the nasal limbus there is a whitish mass about three by two millimeters. There is decided congestion around the cornea except above—this is red rather than purple. Slight thickening of the conjunctiva at lower temporal margin. Pupils and irides normal. Where she has been living it is sunny, windy and dusty; auto driving aggravates her condition. Had tubal abscess in January, 1914, and rheumatism for a year following. At that time or during the summer of 1914 had been given antigonococcic serum.

The case had been under Dr. Crisp's care for a month, during which time he had occasionally applied tannin and administered aspirin, but for the past several days had been using atropin.

Discussion.—Dr. Black believed the cornea to be somewhat anesthetic. Did not appear to be vernal conjunctivitis. Thought the condition due to some general infection, probably gonorrheic.

Dr. Boyd said that the condition was what he regarded as a localized cyclitis, and like most such cases, due to systemic infection. Believed the congestion would rapidly subside under atropin.

Dr. Jackson did not think there was evidence of the ciliary body being involved, though possibly due to general infection.

Dr. Libby had had a similar case that cleared up.

Dr. Walker looked upon such cases as episcleritis and treated them with an ointment of ammoniated mercury, grains five to dram two.

Dr. Neeper asked what tissue is involved. The case is of interest to locate the cause or seat of the trouble rather than treatment of the eye.

Meeting of November 20, 1915. Dr. W. C. Bane, presiding.

Injury From Shot.

Dr. W. H. Crisp presented D. P., aged seventeen years, who, on September 28th, was fired at with a shotgun from half a block away. One shot penetrated and probably passed completely through left eye to inner side of orbit. Scar in sclera up and out. Tension and fundus show partial absorption of hemorrhage, and probably general detachment of inner coats. Vision, faint light perception.

Discussion.—Dr. D. H. Coover said that he could not see what was to be gained by waiting; that the eye was soft and it would be safer for the patient if removed.

Dr. F. R. Spencer believed that the eye should be removed, and the sooner the better.

Dr. J. A. McCaw said that he had seen a similar case two years ago, and but recently saw the case, and that the eye was gone.

Dr. Edward Jackson called attention to the fact that shot wounds do not usually cause sympathetic ophthalmia, but thought in this case it might be well to take the eye out.

Dr. G. F. Libby was of the opinion that if the condition of the eye prevented work, that it should be removed; otherwise, might wait.

Tuberculosis of Retinal Vessels.

Dr. Edward Jackson again presented Mrs. L., who was first before the society February 20, 1915. Now shows appearance of retinitis proliferans. Vision, right eye, 0.03; left eye, 0.3.

Left has improved from 0.2 to 0.3 in last two months. No fresh hemorrhages in either eye since May. Note with ophthalmoscope: Right eye, scar tissue above, dragging retinal vessels forward to plus 12 D. Left eye, scars in vitreous.

Discussion.—Dr. Bane said that the society was much indebted to Dr. Jackson for again showing the patient. He remembered the case, and recalled that he thought at the time it was first seen that it might be albuminuric retinitis.

Dr. Spencer wished to know if there were other tubercular lesions, to which Dr. Jackson replied in the negative.

Interstitial Keratitis.

Dr. C. E. Walker presented O. K., aged eleven years, who three months before had been struck in the left eye by a sunflower. Noticed a spot on eye, but no further trouble. When a child was very sick with cholera infantum. Lost teeth early. Present condition: Enlarged tonsils. Interstitial keratitis. Blood vessels of iris enlarged. Exudate in anterior chamber. Posterior synechia. Cyclitis. Tension, minus. Enlarged follicles.

Treatment.—Atropin, dionin and hot applications. Yellow ointment. Internally, calomel and syrup iodid of iron. Tuberculin had been used.

Discussion.—Dr. Walker, replying to Dr. Spencer, said that the boy had had rheumatism, but had recovered from it.

Dr. Spencer, continuing, said the case looked like one of sclerosing keratitis, and in no way connected with the injury.

Dr. Libby said the accident having been so trivial, if present condition were due to it, it would suggest disturbed metabolism.

Hemorrhagic Choroiditis.

Dr. Walker also presented Miss R. J., aged twenty-three years, who had been wearing, right eye, — .75 ax. 180°; left eye, — .50 ax. 180°, and who for the past six weeks had been having headaches and failing vision. Examination revealed chalazion right upper eyelid, hemorrhagic choroiditis and corneal astigmia right eye 2, left eye 1 with rule. October 2, 1915, right eye vision, 20/50 w. — 2. ax. 180°; left eye vision, 20/200 w. — 1. ax. 180°. November 20th, under homatropin, right eye vision, fingers at six inches, w. plus .50 $\overset{\frown}{\smile}$ — 2. ax. 180°; left eye vision, 20/50 w. plus 1. ax. 90°. Advised neurologic, X-ray, and nose examination. Urine negative. Treatment: Unguentum hydrarg., potassium iodid and mild chlorid. In the eye, solution and ointment of boric acid and dionin.

Discussion.—Dr. Walker, replying to question of Dr. Bane as to the presence of hyalitis, said that there was.

Angioma.

Dr. H. R. Stilwill presented baby F., four months old. First seen October 18th. Normal labor. Weight at birth, six and one-half pounds. Always healthy. No birth marks on the body. Eight weeks ago mother first noticed swelling over the left tear sac, since which time it has been increasing in size. The swelling is of bluish tint and involves the connective tissue of the inner halves of the upper and lower lids and the region of the lacrimal sac. Swelling is temporarily increased when the baby cries or the head is placed in a dependent position. The tumor is soft and does not pulsate. The puncta are open, and there is no epiphora. No involvement of the eyeball.

Discussion.—Dr. Crsip was suspicious that it was not angioma. Remarked that injection of boiling water had been suggested for such condition.

Dr. Jackson said it looks as though it is largely venous. If it has not increased in size, would wait. If it has increased in size, would ligate or use carbon dioxid snow.

Dr. Walker had had a case very similar to this one, in which he cut down and dissected it out with fine result. Does not favor injection methods.

Dr. Spencer has used electric needle, from which he obtained temporary but no permanent improvement.

Bilateral Dacryocystitis—Prince and West Operations.

Dr. W. C. Bane presented Mrs. M. M., aged fifty-four years. August 11, 1915, left side was operated for dacryocystitis, following closely the method of Dr. A. E. Prince. Opening into the nose was kept open until healed by passing No. 14 Theobold probe every few days. Recovery was uncomplicated and result excellent.

Two weeks later the West operation was done upon the right side, by Dr. Baum, at the clinic. Uncomplicated recovery, but at times there is some overflow of tears.

Dacryocystitis—Obliteration of Sac (Gifford's Method).

Dr. Melville Black presented this patient, who had suffered long from dacryocystitis and had been probed and syringed by different men for long periods of time without benefit. Two weeks before, under local anesthesia and at one sitting, the lacrimal sac had been obliterated by the application of trichloracetic acid to its interior. The operation was but slightly painful; no sutures were used, and union took place by first intention. No moisture can be obtained by pressure over the region of the sac, and the patient claims that there has been no trouble from epiphora since the operation.

Discussion.—Dr. Boyd was of the opinion that as the simplicity of the operation, the readiness with which it can be done under local anesthesia, the little after-treatment required, the insignificant scarring, and the satisfactory results following the Gifford method of obliterating the sac becomes better known, in all cases of chronic dacryocystitis it will become the routine procedure.

Herpes Zoster Ophthalmicus.

Dr. W. C. Bane presented Mr. J. H., aged seventy-two years, who was first seen November 17th, at which time he gave history of having had la grippe three weeks before, accompanied by an eruption on the left side of the forehead, extending into the hair and upon the cheek. Pain upon left side of head and in left eye, with impaired vision of that eye.

Examination.—Vision of left eye, fingers at one foot. Superficial ulcer of the cornea two by three millimeters. A vertical striated opacity of the central portion of the cornea. Some circumcorneal injection. Iris partly adherent. The eye has been kept closed, and has shown improvement under the use of atropin and subconjunctival injection of two per cent cinnimate of soda.

Vestiges of Hyaloid Vessels.

Dr. Melville Black had a boy present showing remains of hyaloid vessels, extending from the lens of right eye, but not reaching the fundus. Appearance of the fundus resembled that of an albino.

Pemphigus of the Conjunctiva.

Dr. Bane again presented patient whom he had shown to the society at its meeting of April 17th. This patient had been clinically cured of pemphigus of the conjunctiva of the left eye by Dr. Bane, but it had at this time (April 17th) appeared in the right eye, and was being treated along the line that had before proved efficient, namely, use of X-rays, and was last shown because of active ulceration of the cornea. Since the last exhibition of the case, Dr. Bane states that the ulcer yielded kindly to treatment and the patient was greatly improved.

Congenital Diffuse Lens Opacities, Not Opaque to the Ophthalmoscope.

Dr. E. T. Boyd presented a little girl showing the above condition, both lenses being involved, peculiar and interesting in that they were extensive, marked and distinct by oblique illumination, but offered no hindrance to direct ophthalmoscopic examination. The patient with refractive correction possessed vision of 20/20 in each eye.

Discussion.—Dr. Jackson said that he had never seen a case like it, but that he did not believe that the "opacities" were opaque, but thought the appearance probably due to difference of refraction in different portions of the lens.

Blepharochalasis.

Dr. Boyd presented a girl, aged nineteen years, with ptosis of right eye of four years' duration. At the age of fifteen years, time of first menstruation, had attack of angioneurotic edema of right upper eyelid. At second menstrual period the edema again appeared. Subsequent attacks of edema of the right upper eyelid have occurred, but the ptosis dates from its earlier appearance, coincident with the onset of menstrual life, and it is this clinical history that points to the above diagnosis.

Discussion.—Dr. Jackson believed it to be a form of blepharochalasis, and concurred with Dr. Boyd in that some form of advancement of the levator would be the proper operative procedure.

Foreign Body in the Sclera.

Dr. C. E. Walker reported a case in which a piece of steel had been embedded in the sclera above the optic nerve for a period of twelve years with the eye still good.

Foreign Bodies in the Eyeball.

Dr. F. R. Spencer reported the case of Mr. W. O. McK., who first consulted him October 26, 1915. He is thirty-three years old, widower, and gave the following history: While working in a mine at Lakewood, Colorado, he struck a "missed hole" of giant powder the afternoon of the 26th. He saw him a few hours after the injury, and found the following: The right eye had a very few fine particles of mud and sand embedded in the lids, cornea and ocular conjunctiva, but all were very superficial and easily removed. The left eye had been penetrated by two fine pieces of rock. One entered the sclera a few millimeters from the limbus in the inferior nasal quadrant, and the other entered the cornea just external to the pupillary area, splitting the iris from above one millimeter external to the pupillary border to the ciliary border.

All of the foreign bodies on the surface of each eyeball were removed and both pupils were dilated with atropin. It has been impossible to find either piece of rock in the left vitreous, although the two pieces probably lie in the anterior portion of the vitreous.

The lens has not shown any evidence of injury, but the vitreous now has some floating opacities as evidence of the irritation from the foreign bodies. The tension of the left eye was slightly diminished at first, but has been normal since. The tension of the right eye has been normal from the first.

The question of trying to save the left eye now presents itself, although the danger of sympathetic inflammation compels one to give the right eye the first consideration.

Meeting of December 18, 1915. Dr. W. H. Crisp presiding.

Argyrosis—Polypoid Granulations at Outer Canthus.

Dr. Edward Jackson presented Mr. S., aged forty-seven years. Vision and eye grounds normal. Left eye, staining of inner surface of lower lid, with polypoid granulations on lid margins near the outer canthus. Has used solution of silver salt about a year for chronic inflammation. Upper lid smooth. Right eye normal.

Discussion.—Dr. E. R. Neeper said he had a case very similar to the one shown, in which the meibomian ducts are involved.

Dr. W. L. Hess believed that the irritation of the tears would account for the trouble at the outer canthus.

Dr. J. A. Patterson suggested that it might possibly be due to staphylococcus infection.

Dr. C. A. Ringle was of the impression that the silver had been used longer than directed.

Dr. W. H. Crisp thought that the solution must have been a strong one. Noticed band from internal canthus to cornea.

Dr. C. E. Walker said that years ago silver was used much more extensively than now. Rarely used it stronger than two grains to the ounce.

Dr. Jackson said that he would probably take a section of the polypoid growth and submit it to microscopic examination.

Dr. E. T. Boyd remarked that such cases of argyrosis should serve as a warning to exercise more care in prescribing silver salts, and cited a case in which marked staining of the sclera corresponding to the lower cul-de-sac had taken place, the result of long continued use of a strong solution of argyrol.

Dr. Neeper stated that he now had a case with argyrosis from argyrol, but that he was continuing its use because nothing else could be found to control the chronic condition.

Macular Burn from Sun Gazing.

Dr. Melville Black presented a young man, thirty-three years of age, who, three years ago, while a soldier in the regular army, entered into a sun gazing contest with three other soldiers. They were endeavoring to see which one could look at the sun longest without winking. This man won the contest and acquired a burn of the macular region of each eye which caused a relative scotoma that reduced his central vision to one-half of normal and made it necessary for him to retire from the army. With the ophthalmoscope, in each macular region is seen a spot about one-fourth the size of the disc which is lighter in color than the surrounding retina. Its edges are well defined and its surface has a delicate mottling. The relative scotoma is ten degrees in diameter. The sun gazing caused a scotoma in one of the other men, but he recovered and continued in the service. The other two did not look at the sun long enough to do them any harm.

Discussion.—Dr. J. A. Patterson had had a case with macular changes from snow blindness.

Dr. Otis Orendorff recalled the case presented by him one year ago in which macular changes had taken place, the result of snow blindness.

Dr. W. F. Matson believed the case to be similar to snow blindness.

Dr. E. T. Boyd said that his observation did not indicate that fundus changes often took place as a result of snow blindness, and Dr. Jackson suggested that it was because the exposure was not of sufficient duration.

The question arose as to what changes the direct rays of the sun would produce, and Dr. Jackson said that if sufficiently prolonged they would cause coagulation of the albumin in the tissues.

Dr. W. H. Crisp believed the changes to be of a chemical nature.

Dr. A. C. Magruder stated that he and a confrere had been using heliotherapy for various conditions, and that in some of the cases the treatment had to be suspended because of the edema produced, which they had attributed to the heat rays.

Dr. W. L. Hess cited Birch-Hirschfeld's views wherein he says, in referring to blinding by the sun's rays, that "there is a swelling and warping of the outer segments of the rods and cones, followed very soon by a swelling and hyperchromatosis of the bodies of the rods and cones and a distinct involvement of the pigment epithelium and the choroid." As to cause, he ascribes the chief importance to the luminous rays.

Retinitis Proliferans.

Dr. Black presented the case of a young man, twenty-five years of age, who discovered when fifteen years old that the vision of the left eye was eccentric. How long previous to that time it had existed he does not know. It has not changed since. He first noticed black spots in front of his right eye four years ago. Last September a big floater appeared in this eye, and a few days ago a piece apparently came off from it, floated around a while and disappeared.

Condition.—The left eye presents a very beautiful picture of retinitis proliferans. The proliferation begins above the disc, somewhat pitcher shaped, runs downward and slightly nasally, and covers the disc completely. This proliferation is seen to be eleven diopters higher than the surrounding retina. Its edges are sharply defined, and its body has a variegated, glistening white appearance. There are a few blood vessels running over it, especially in its upper portion. It does not cover the macular region, nor is there, apparently, a lesion in that situation to account for the eccentric fixation.

The right eye.—There is a hemorrhage situated about seven diopters in front of the optic nerve and extends nasally in the form of an opaque body, which grows slightly larger and terminates abruptly one-half disc diameter to the nasal side. That portion which lies over the disc does not entirely obscure it. When looking into the temporal portion a narrow streak of dark reddish color is seen running in a curved manner from the upper temporal portion of the vitreous into the lower central portion, where it disappears. After having observed him for a few days he was confident that the large floater in front of the disc is a hemorrhage undergoing very slow absorption. He was in hopes that it will be entirely absorbed and not undergo organization.

Vision, right eye, equals 20/20; left eye, equals eccentric fixation.

Retinal Hemorrhages in Right, Massive Exudate in Left Eye.

Dr. Black also presented this patient: A vigorous young Irishman, who says his left eye has been troubling him a little all summer. About a month ago he happened to put his hand over his right eye and found the left eye blind except for a little light in the temporal field. About three weeks ago he was bending over some work and upon straightening up he found he could scarcely see with his right eye. He is a miner and has been overcome by the fumes of nitrous powder several times. Not long before the blind spell in the right eye, his eyes were filled with dirt while working with a pick in rock and dirt.

Condition.—Right eye, fairly good picture of neuroretinitis hemorrhagica from Bright's disease.

Left eye.—This eye presents a remarkable picture. The disc is covered by a dense elevated exudate which terminates abruptly on the temporal side of the disc. The edge of this platform curves over in a wrangle of blood vessels, some of which seem to extend out into the free vitreous. The jump from this edge down to the retinal level is about eight diopters. Above, below and the entire nasal portions of the retina are detached. There is no discernible movement of the retina when the patient moves the eye. Transillumination is perfect on all sides of the eye. In my opinion the diagnosis lies between two conditions—namely, retinitis proliferans with retinal detachment, and metastatic endophthalmitis. A picture of the latter condition is shown by Oatman in his stereoscopic pictures of the fundus. This picture is here shown, and it resembles in many respects the appearances seen in this patient's eye.

A very careful examination of his urine and blood was made and found negative. His blood pressure was one hundred and twenty-five with a low vasomotor tone. He is constipated. He regarded the condition of the left eye as old and beyond help. It is the right which concerns us and toward which constitutional treatment is to be directed. His nasal condition appears to be normal, and we can find nothing wrong with his teeth except a mild pyorrhea which is now being treated.

Discussion.—Dr. J. A. Patterson thought the question is what to do to prevent future hemorrhages.

Dr. F. E. Wallace reported a case of recurring retinal hemorrhages that, notwithstanding all tests, could not be explained.

Dr. Edward Jackson said that in retinal hemorrhage proper, hemorrhage extended into the vitreous. As to causation—tuberculosis often is the cause, and with this in mind the tuberculin test should be made in these cases. In one of the cases shown by Dr. Black the vessels above indicate phlebitis, very similar to cases shown by him of tuberculosis of the retinal vessels.

Dr. J. A. Patterson had seen cases with greatly dilated and tortuous retinal veins to the extent that he sometimes felt that tuberculosis could at least be suspected by their appearance.

Dr. W. C. Bane had seen the last patient presented by Dr. Black, and regarded the left eye as being a case of retinitis proliferans. Right eye, taken in connection with the condition of the left eye, leads him to believe that there was a hemorrhage in the left eye as basis for the present condition.

Dr. H. R. Stilwill saw the case some time ago, and to him it resembled pseudoglioma.

Dr. Jackson believed that a massive exudate into the retina would explain the condition better than most anything else.

Dr. Bane said that a Wassermann should be made, as syphilis was often connected with retinitis proliferans.

Steel in Vitreous Removed—Perfect Vision.

Dr. W. C. Bane presented a man from whose eye he had removed a piece of steel from the lower part of the fundus last July. Perfect vision at the present time.

Tumor of the Anterior Chamber.

Dr. F. E. Wallace reported the following case: E. J., aged fourteen months. Fourth child. Labor normal. One child died of summer complaint at three months. Patient still nurses. Is well nourished and developed. At birth mother noticed a small tumor under lower right maxilla, near angle. She described it as freely movable. Mother also discovered a pin head sized tumor of red color in anterior chamber of right eye, lower inside portion. She described both tumors as gradually enlarging. Soon following, a slight obstruction to breathing was noticed. The child's forehead was quite prominent and square shaped. Thinking the child to be luetic, he gave luetin test with negative result. There is present now a large prominent tumor extending from right ear to beyond the median line, five inches long by two inches wide, which stands out beyond the plane of face, is movable and quite hard, yet has sensation of fluctuation. Spasmodic breathing is present, whether asleep or awake, similar to action of a child after sobbing. Does not nurse continuously but stops to breathe. The tumor of the eye is bright cherry red. Fills that portion of the anterior chamber from inner axis 165° downward and around to axis 75°, thence extends upward axis 120°, then rounding back to point at attachment, axis 165°. Its attachments seem to be in the angle between axis 165° and axis 75°. It is flattened anteriorly, posteriorly and is about three millimeters thick at its center. It is oval in contour. The anterior surface is three-fourths of its diameter, and from its attachment upward is in contact with the posterior surface of the cornea. The entire posterior surface lies in apposition with the iris and lens. Its size is approximately eight by six millimeters. The iris is dilated. Its pupillary edge, about three or four millimeters, can be seen back of the tumor apex, but no fundus reflex can be made out. Pupil attempts to contract when condensed light is used. Iris is hazel brown in color and is like its fellow. Sclera not at all congested or engorged, and no inflammatory symptoms are or have ever been present. Eyeball is not enlarged. On transillumination the eye gives a light uniform reflection. After action of atropin the iris is seen to be dilated a trifle. Through a slit a normal fundus is seen. The tumor apparently is not attached to the iris. The tumor mass is uniform and the surface fairly smooth, but it has an egg shell appearance. When viewed with a magnifying glass, throughout the tumor mass a faint network is seen, but no blood vessels can be made out. The tumor was removed through an incision at the limbus, near the tumor attachments. It was soft and mushy and had to be removed piecemeal. Bleeding very free. The mother states that the tumor frequently lost its bright cherry red appearance and became pinkish. This I noticed, also, when seeing the child at a second visit. The fellow eye is apparently normal and pupil reacts naturally.

The pathologic findings of the tumor, as made by Dr. F. M. Heller, are as follows: Endothelioma. Operation for the removal of the neck tumor demonstrated it to be one of the thyroid gland. The age of the child being but fourteen months at the time of its removal, and it having been noticed as a small growth at birth, makes the case a very rare one. The second day, following the removal of the eye tumor and the absorption of the blood from the anterior chamber, the lens and iris appeared in good condition.

Dr. Wallace did not see that any pathologic connection could be possible between the eye tumor and the thyroid tumor. Altogether the case had been a very interesting one.

Discussion.—It was the impression of several of those who spoke upon the case reported by Dr. Wallace that there may have been some pathologic connection between the eye and neck tumors, but no microscopic examination of the latter having been made, this could be neither verified nor controverted.

Foreign Body Injury.

Dr. Otis Orendorff reported the case of Mr. K. W. S., aged thirty-three years, farmer; in perfect health and never had any trouble with the eyes. On the afternoon of last Thanksgiving day the left eye was injured by being struck with a piece of iron chipped off a nut with a cold chisel. There was no pain at the time and has been none since; however, there was immediate blindness. The patient reached me about six hours later, with evidence of a penetrating wound of the globe. There was a horizontal incision through the center of the cornea three millimeters long, the foreign body having also penetrated the lens, producing a traumatic cataract without injuring the iris. The anterior chamber was obliterated, but there was no protrusion of the iris. Taking it for granted that there was a piece of iron some place in the tissues, the giant magnet was cautiously applied, but with no result. A hand magnet was then sterilized and thrust deeply into the vitreous in different directions, but without success. The eye was then put under the influence of atropin and bandaged and the patient put to bed. The next morning there were several X-ray pictures taken, but the plates showed nothing that could even be called a suspicion of a foreign body. There was, of course, a severe reaction, but the eye did nicely, and today, three weeks after the accident, the eye is quiet and a large amount of the lens débris has been absorbed and the pupil is clearing up, the vision being shadows distinctly. There is a small anterior synechia.

Question: Is there a foreign body in this eyeball or orbit? And if not, how would it be possible to have such an extensive injury?

The piece of iron that is missing from the nut would be as large as the finger nail, and is much larger in its smallest dimension than the wound in the cornea.

E. T. Boyd,
Secretary.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Stated meeting, November 11, 1915. Dr. William Zentmayer, chairman.

Symposium on Muscle Imbalance and Its Treatment.

Anomalies of Refraction: Dr. Zentmayer said that about ninety per cent of ametropes show a deviation of the visual axis when fusion is broken up, either by making the image of the object fixed different for the two eyes or by displacing the image in the one eye. How are we to view these slight deviations? Landolt believes they are in no sense pathologic and are not even to be considered as tendencies to deviation, but simply show the position the eye would take if binocular vision were destroyed. Others look upon them as due to a disturbance between accommodation and convergence produced by the ametropia, while still others believe that certain types represent a stage in evolution—that is, that exophorias are sometimes an expression of atavism. Hyperphoria is probably always anatomic. Dr. Reber has endorsed this view. Using the terms representing the nature of the deviation rather than the conditions underlying them, such as convergence insufficiency, etc., it may be said that esophoria in the distance in hyperopia is due to the convergence associated with the accommodative effort required to correct the hyperopia. The same muscle status in myopia is more difficult to explain. Dr. Wallace has suggested that it is due to the excessive convergence used by myopes at near work not relaxing in distant vision. This may explain the moderate degrees, but it seems inapplicable to the very large number of low degrees of myopia met with. In all classes there are a few due to anatomic causes. Hyperphoria is of less frequent occurrence than lateral tendencies, occurring in about fifty per cent of ametropia. As in the great majority of cases it is of very low degree, it does not frequently call for correction. Less than two degrees usually produces no symptoms. The effect of the correction of the ametropia upon the heterophorias of very low degree is not marked. Esophoria associated with hyperopia is usually reduced in amount. Exophoria for near associated with myopia will be reduced by the correction of the myopic refraction. The principles to be borne in mind in ordering glasses for the ametrope in the presence of a heterophoria are that in convergence excess the total hyperopia is to be corrected, in convergence insufficiency only as much of the hyperopia as is demanded by the age of the patient and his occupation. In myopia with convergence insufficiency the myopia is to be fully corrected. In myopia with convergence excess, an undercorrection is indicated.

Prism and Operative Treatment: Dr. Posey spoke of the incorporation of prisms with the lenses correcting ametropia as one of the most valuable means of overcoming muscular asthenopia. The chief value of prisms, when used in this way, he thought, was in hyperphoria, though he could give no fixed rule to follow for their employment in these classes of cases. Vertical insufficiencies of one degree or less very rarely require correction, and indeed the correction of the ametrope usually relieves the symptoms attending hyperphoria of even two degrees; yet he had prescribed vertical prisms in some cases of hyperphoria of less than two degrees, where such symptoms as unilateral headache, unilateral twitching of the eyelids and dizziness had persisted after careful spherocylindric corrections. Defects of over five degrees usually call for a tenotomy of an elevator. In no case is it desirable to prescribe a prism which corrects all of the hyperphoria.

In exophoria of moderate degree, prisms with bases in, correcting a third or a fourth of the muscle error, are very useful in combination with the ametropic correction for near work. When strengthening of adduction by operation, preferably by a de Wecker capsule advancement of both interni, is refused by the patient, prisms with bases in are often of value for constant use, but in no case should a prism higher than five degrees in each eye be prescribed, on account of certain optical disadvantages as well as the weight of the lenses.

In esophoria prisms with bases out have a limited usefulness. Dr. Posey prescribes them chiefly in cases of hypermetropia with esophoria of about ten degrees, when troublesome distance asthenopia is present, and when the full correction of the hypermetropia cannot be prescribed on account of residual spasm of accommodation.

Dr. Posey asserted that in his opinion nearly all muscle errors, apart from those associated with considerable degrees of ametropia, are dependent upon faulty anatomic conditions. He has found prism exercises of value only so long as they were maintained, and he has never seen any permanent change in the muscle error result from them. While the constant use of prisms does perhaps in some cases unmask latent muscle errors earlier than is the case if prisms are not prescribed, this precipitous unmasking is not harmful, and occurs in such a slight degree that in most instances it is unnecessary to increase the strength of prisms to alleviate a recrudescence of muscular asthenopic symptoms. Dr. Posey decried graduated tenotomies, socalled, and believed no operative measures justifiable unless there is an appreciably high muscle error. When the external rectus is divided for the relief of exophoria, prism exercise to bring up adduction should be actively practiced for weeks afterward. In such cases systematic rhythmic exercises, with increasingly stronger prisms, were of decided value. He had never seen permanent benefit derived from exercise of the abductors or of the levators or depressors.

W. W. Watson,
Secretary.

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XIII.

OPTIC ATROPHY—OBSERVATIONS ON A SERIES OF CASES OF UNUSUAL INTEREST.

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PHILADELPHIA.

The following cases from the records of our clinic at the Hospital of the Protestant Episcopal Church, Philadelphia, have sufficient points of interest, we believe, to warrant recording.

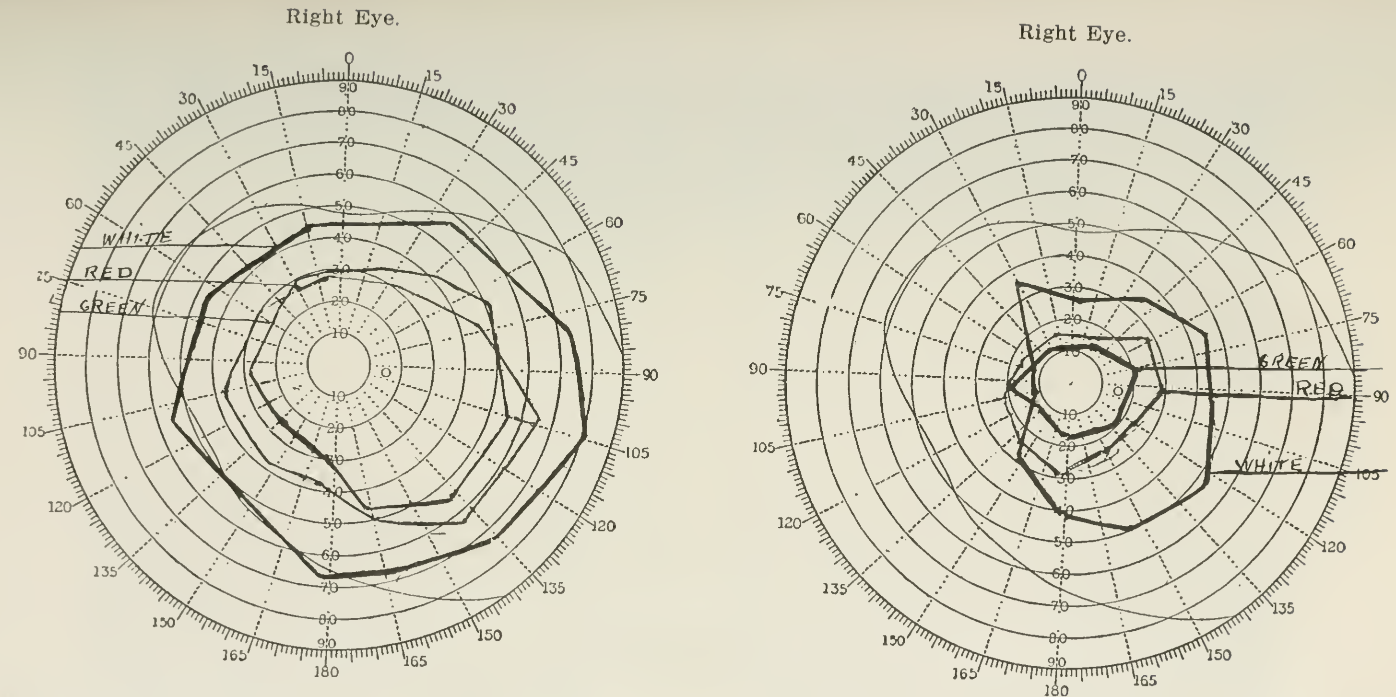
UNILATERAL OPTIC ATROPHY IN A CHILD DUE TO SYPHILIS.

A case of this character was observed in a child thirteen years of age (New system of records, Card No. 1018, December 2, 1915) as the result of inherited or congenital syphilis. The patient was a school girl and gave a very vague history of a still more vague illness dating back one year (December, 1913), in the course of which she suffered with "nervousness," vertigo, neuralgic pains in the head, etc., causing her to be away from school, and at times to be confined to bed. She also had trouble in walking about, due to giddiness and vertigo. Previous to this attack her vision had been normal. In no way did the illness resemble meningitis of any variety, but during the course of it she had difficulty in seeing out of the right eye, which difficulty disappeared after her recovery (about March 1, 1914). When she returned to school she noticed failing vision in the left eye, which became progressively worse, although she was under observation and treatment at this period at St. Christopher's Hospital, Philadelphia. The record here (Book No. 24, p. 6) shows that in May, 1912, her vision in right eye was 5/8 and left eye 5/10 and that she had been sent from school by the school inspector on account of this deficiency in vision. Glasses were prescribed without benefit. Her attendance at the latter hospital was somewhat irregular, and she was not under continuous treatment until recently.

In the latter part of 1914 it was noticed that the patient showed evidence of atrophic changes in both optic nerves, but especially pronounced in the left eye, the vision of which rapidly dropped to zero, with intermittent light perception.

The record of the detailed examination on December 2, 1914, shows: Right eye, vision 5/6, lids and conjunctiva normal; cornea clear; pupil in repose semidilated; reaction to light, accommodation and convergence normal, prompt and free. No gross muscle palsies, although when both eyes are used there is a slight paretic movement in the periphery. The media are clear, the disc is round with a broad cupping extending to the temporal border, very deep and atrophic in appearance, although the nasal side of the nerve head is not cupped and is pinkish in color. The choroidal ring extends almost completely around the nerve except at its superior border. The vessels are normal in character and course; they may be said to be somewhat distended if at all altered, but in no instance are they contracted in any part of the fundus. There is slight choroidal disturbance in the periphery of the fundus. Otherwise the fundus of this eye is normal.

Left Eye.—Vision is reduced to the faintest perception of concentrated light in the dark room. There is slight divergence. There are no gross muscle palsies, but when both eyes are employed together there is slight paresis in the periphery of the field of motion. The pupillary reaction to light is almost absent, but may be demonstrated by the use of the magnifying glass in the dark room with concentrated light. Consensual reaction for light, accommodation and convergence is obtained, but when the left eye is used alone there are no pupillary reactions demonstrable except as noted for light. The media



No. 1018. Field taken December 2, 1914. No scotomata for white, red or green.

No. 1018. Field taken January 20, 1915.

FIGURE 1.

Two right fields of case of otitic atrophy in a child.

are clear; the nerve is round and decidedly atrophic with a broad and deep atrophic excavation; the vessels are distended and tortuous on the disc, especially the central retinal vein, but at no part of their course are the vessels contracted. The choroidal ring is complete, but otherwise there is no gross lesion except a slight haziness of the retina.

A later examination (by F. K.) showed that in the right eye the pupillary reactions to light, accommodation and convergence were normal. Ocular movements were slightly paretic in the periphery. There was no gross lesion of the fundus.

In the left eye there was a very feeble reaction to light, if any. There was no reaction to light, accommodation or convergence except when both eyes were used together, thus showing the reactions to be consensual. The fundus showed atrophy of the optic nerve. The nerve was bluish white in color; the arteries and veins were full, and this fullness extended to the periphery.

It was also noted at this time that the knee jerks were slightly plus. The temperature was taken in order to eliminate any infectious process still in existence, and was found to be normal.

The hearing was examined likewise, the patient having complained of earache from time to time. Recently she had had an attack that had lasted for three days. At the time of this examination, hearing by air conduction on the affected side (left) was much diminished for the middle C tuning fork. Bone conduction was increased. The high-pitched fork was diminished by about one-half, as was also the low-pitched fork. The right side showed no departure from normal. The left ear also showed upon examination a whitish purulent discharge with odor in the external auditory meatus. This condition had been of indefinite duration. The patient denied ever having scarlet fever or measles. After the removal of the discharge the examination showed the drum bulging in the upper and posterior portion, the handle of the malleus was obliterated by the inflammation. Immediate incision was advised and performed. The right ear was normal. This condition served only to add some confusing data in the study of the case, and was subsequently shown to have little direct relation to the real condition under consideration.

The examination of the nose showed the right side somewhat involved in the process described in detail in connection with the left side. The left side showed purulent discharge beneath the middle turbinate, which was considerably enlarged. Pressure beneath both superciliary regions elicited tenderness, worse on the left side. Pressure on the sides of the nose at its base elicits tenderness, worse on the left side. This suggested bilateral frontal sinuitis, and ethmoiditis on the left side, but these symptoms were not constant and could not be demonstrated with any degree of regularity. Transillumination showed all the sinuses to be unaltered from the normal.

The tonsils had been removed two years previously at St. Christopher's Hospital by the dispensary physician. There was present a postrhinopharyngeal discharge. Remnants of adenoids were present, and there was also evidence of a traumatic amputation of the uvula.

The child was admitted to the Episcopal Hospital in the early part of 1914, and subjected to various detailed examinations to determine the cause of the optic atrophy. The nose, throat and ear examinations by Dr. C. C. Eves of this department seemed to indicate the presence of a low grade of inflammation within the frontal (right side) ethmoid and mastoid (left side) sinuses which could not be demonstrated by the several skiagrams subsequently taken of the patient.

At the time of admission the fields in the right eye were faintly good, but six weeks later, despite active treatment and increase in central vision, they were markedly contracted (see charts, page 221).

The Wassermann test made at this time was positive + 4. Spinal Wassermann was negative.

Inunctions of mercury were instituted immediately, and within a few days the patient was very severely ptyalized. Neosalvarsan was given in increasing doses, at intervals, up to five-eighths gram.

After a period of three months of treatment the Wassermann test was found to be negative. The vision of the right eye increased to 5/5. In the left eye, hand movements and light perception were observed at times at a distance of six inches. The atrophic process seemed to be checked, and the nose and ear conditions abated so that they were no longer apparent. The interest in this case lies in the occurrence of a simple optic atrophy of syphilitic origin in so young a patient.

The negative Wassermann reaction, in our experience, is not to be relied upon implicitly in ocular conditions, especially nerve lesions. A strongly positive reaction is a strong reason for the use of antisyphilitic medication, but its absence is not necessarily a contraindication for this kind of therapeusis. In the presence of a strongly plus Wassermann reaction, the use of salvarsan and neosalvarsan are indicated, even in advanced optic atrophy, as is well illustrated by the following case.

OPTIC ATROPHY WITH RESTORATION OF VISION AFTER NEOSALVARSAN TREATMENT.

In the case to be described under this heading, absolute blindness was so affected by antisyphilitic treatment with salvarsan injections that the patient was brought to a condition in which he could distinguish light from the windows and gross objects (as dark objects) about the room, a most comforting condition, as compared with the darkness in which he previously lived.

This patient was a man about thirty-four years of age, a tailor and presser by trade, who entered the hospital on January 9, 1915 (house case A. D.). At that time the history showed that his father, mother and three brothers were living and well. He was married and his wife was living and well. There were no children.

The patient had had failing vision for the past two years, beginning in the left eye. At times he had had sharp pains in the left ear, extending over the left half of the head. This began several months before he noticed failing vision. Upon admission there was a slight ptosis of the right upper eyelid. The pupils were widely dilated, and reacted very faintly to light. Vision in the right eye consisted of hand movements, seen at times. Vision in the left eye consisted of faint light perception. The laboratory showed the Wassermann test to be positive plus 2, but the spinal Wassermann was doubtful. There was an absence of any general nervous disease. The X-ray examination showed a normal sella turcica.

The patient was immediately placed upon mercurial inunctions, with the forlorn hope that some good might be obtained. On January 15, 1915, a full dose of neosalvarsan was given in addition. On January 27, 1915, the Wassermann test was plus 4. The inunctions, which were subsequently supplemented with the internal administration of potassium iodid, resulted in negative Wassermann tests on February 24, March 9, and March 12, 1915.

The patient suffered no inconvenience from his treatment, although he had four injections of neosalvarsan. During the last six weeks of his treatment he had received injections of strychnin sulphat (grain one-thirtieth) into his temples.

After three months' treatment he could readily find his way about the hospital. Aside from occasional intense headaches and attacks of red vision, he was comfortable.

OPTIC ATROPHY COMING SUDDENLY WITHOUT IMMEDIATE OBVIOUS CAUSE.

This condition is illustrated in the following history: H. W., fifty years of age, driver by occupation, noticed rapid loss of sight, accompanied by no other pain or distress. He was treated by his physician for several weeks and was then referred to Dr. Krauss. When examined it was found that he was absolutely blind, with white atrophic nerves and moderate contraction of the retinal vessels. There were no choroidal or retinal disturbances. He was admitted to the hospital. Careful examination by the internists failed to reveal any other nerve lesion or cause for the atrophy.

Wassermann tests were always negative. He was placed under active antisyphilitic medication, including salvarsan, without any effect whatsoever. Soon after his admission to the hospital he developed a slight nystagmus which has continued. One year later his pupils, which had been equal and dilated, immobile to light, became unequal, the left contracting several millimeters. The ocular condition remains the same, namely, extreme optic atrophy, white nerve with vessels reduced to mere threads. There are no symptoms of degeneration of his nervous system elsewhere.

OPTIC ATROPHY WITH (LEFT) HOMONYMOUS HEMIANOPSIA.

The case of T. J. (No. 680, November 15, 1913), age fifty-five years, was made the subject of special study by Dr. John Gorman in the Episcopal Hospital Reports, Vol. 11, p. 331, 1914. This patient was admitted to the hospital with an incised wound of the neck as the result of an unsuccessful attempt at suicide.

About seven months previously, while seated at his work, he was suddenly seized with dizziness and pain in his head, severe enough to cause him to cease working. Subsequently he began to grow weaker and at the end of a week had to stop working. The only other symptom he noticed was his colliding into people and objects on his left side. Palsy of one arm shortly supervened, and his physician explained to him that he had had a "stroke." Failing to improve, he became morose and attempted to take his life. During the convalescence from the wound in his throat, advantage was taken of the opportunity afforded to examine his ocular condition, but he passed from observation afterwards, and we had no opportunity to further study him.

At this time our notes record that he was fifty-five years of age and appeared as a well-nourished man. He was able to walk to the clinic and gave no evidences of palsies of the face, arms or legs. His central vision was normal in both eyes. The extraocular muscles were normal in function in both eyes, and the balance was undisturbed. Graefe's, Stelwag's and Moebius' signs were absent. There was no exophthalmos or enophthalmos. The edges of the lids were slightly thickened. The lacrimal apparatus was normal, as were also the conjunctiva, sclera, iris, anterior chamber, lens, and vitreous. The tension was normal. The pupils were two millimeters in width, equal and symmetric when fixing for infinity. The pupils reacted to accommodation and convergence, but while the reaction to light was present, it was less sluggish when the light was thrown from the right side. The pseudo-Wernicke hemiopic reaction, however, was not constant. The orbicularis reaction and consensual reactions were present.

The ophthalmoscope showed, in the right eye, that the optic disc was oval at ninety degrees, excavation outside, which, while rather well marked, could be regarded as physiologic. The veins were somewhat irregular and showed depressions where they were crossed by the arteries. The arteries were not very tortuous. There were no hemorrhages or other pathologic lesions. There were no evidences of increased intracranial or intraorbital pressure. The left eye showed the disc to be very gray with a well marked excavation. There was an opaque area in the retina, down and out from the disc, partially covering the inferior temporal vein. This area was sep-

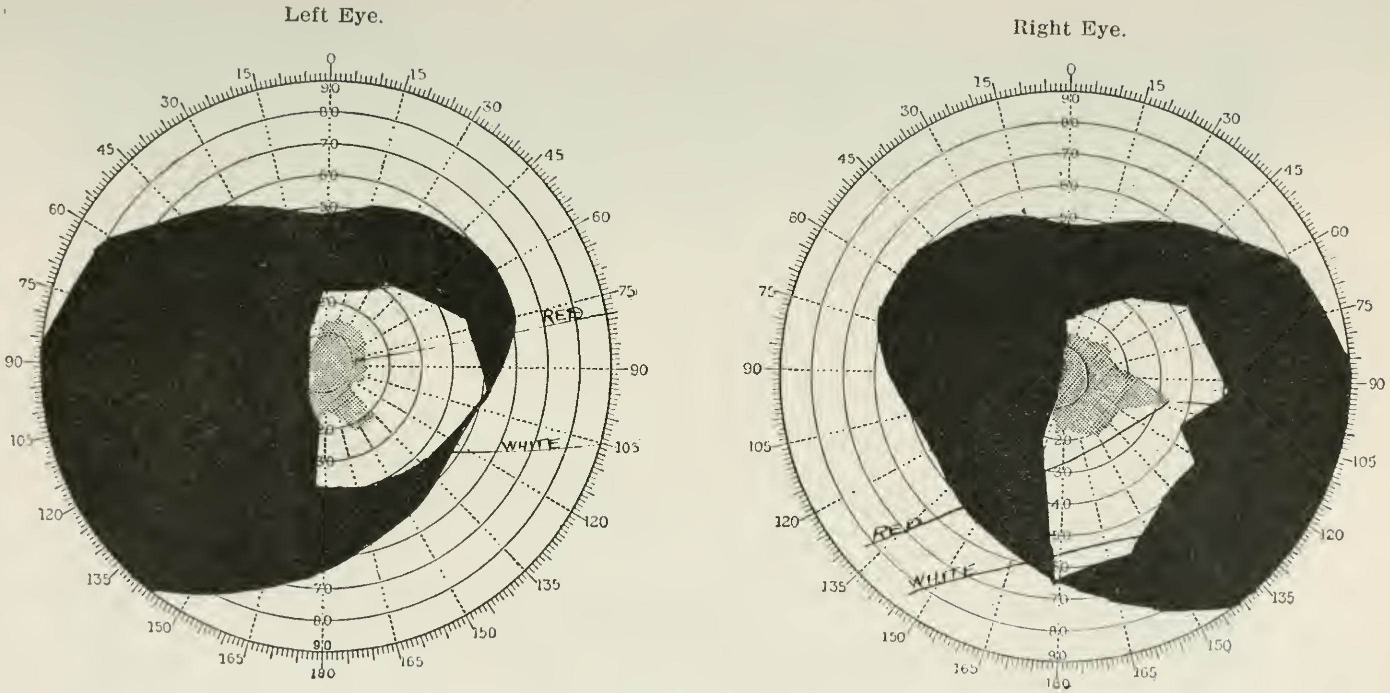


FIGURE 2.

Left homonymous hemianopsia. (Case of T. J.)

arated from the disc by a clear area of retina. The veins were somewhat irregular throughout the fundus. The arteries were somewhat contracted. There were no hemorrhages or other gross lesions.

The visual fields for white showed entire absence of any field to the left side of fixation, and were somewhat contracted at the periphery on the right side. The fields for red were also absent to the left of fixation and reduced to within twenty degrees in the left eye and to within thirty-five degrees in the right eye. (See page 227.)

We have clearly made out the beginning of a form of optic atrophy in this case, and could but assume that there was a lesion of some character in the optic tract or in the visual center, or in the course of the fibers connecting these two parts. J. F. Gorman, one of our associates, analyzed this case carefully from the meager findings at hand, and concluded that there was a cerebral hemorrhage into the occipital lobe in the calcarine fissure to one side of the optic center. In the absence of further evidence to combat this view, we have little choice but to accept it provisionally. Our main reason in presenting this case is for contrast with another, showing a different alteration in the fields.

In attempting to follow up this case to its ultimate outcome, we were shocked to learn that the patient ended his life in the river five months after leaving the hospital.

OPTIC ATROPHY INCIDENTAL TO INTRAORBITAL OR INTRACRANIAL BENIGN NEOPLASM.

This was encountered in the case of S. B. (Vol. 11, p. 643, November 1, 1913), which also presented other interesting features not included in the above title. The patient was a man forty-three years of age, and a designer by occupation. He presented himself to us by reason of a pronounced swelling of the left eye. Examination revealed that the eye was not in itself swollen, but that it was protruding down and somewhat out by reason of swelling and infiltration of the orbital tissues. The right eye also was very slightly proptosed. The condition in the left eye had extended over a period of three years, at times not so pronounced, but had given him no concern until his vision had begun to fail in the right eye, which was about one year previous to his coming to the hospital.

In looking over our previous records in order to verify the patient's statement as to his chief complaint, we find that he had applied to the clinic within the period mentioned, but only for the relief for the beginning presbyopia, and that the symptoms now present were not in evidence at that time.

The vision at his first visit (for the condition now under discussion) was: Right eye, without correction, 5/4.5; with correction, 5/6. Left eye, without correction, 5/200; with correction, 5/200. His chief complaint, in addition to the "swelling" of the left eye, was the blurring of vision, and this blurring of vision extended over a period of nine months, greatly interfering with his work. Our detailed examination at this time showed the eyelids, lacrimal apparatus, tension, conjunctiva, sclera, cornea, iris, anterior chamber, lens and vitreous to be normal. There was a slight bulbar conjunctival congestion. The iris was of a bluish gray color. Graefe's and Moebius' signs were absent. Stelwag's sign and exophthalmos were demonstrated in the left eye. Ptosis was absent. The pupils reacted to all stimuli, but the left was comparatively inactive. The Wernicke reaction was doubtfully present at times in the left eye. Otherwise the pupils presented no departures from normal. The gross muscle balance was normal, and no pronounced defects were demonstrable.

Inquiry into the patient's personal history elicited the usual amount of useless information from which we determine that he drank an occasional glass of beer, and that he never had any venereal disease. Muscular rheumatism was his sole illnes prior to present condition. One of his earliest symptoms was deafness and "ringing" in the right ear, which had been continuous for the last two years. He wore glasses in order to relieve the weakness, as he expressed it, of the left eye, but without benefit. This trouble had been ushered in three years previously by an attack of vertigo. There had been no previous or subsequent other trouble in walking or coordination, but he was unable to find the small squares in the designing paper on account of failing vision, failing color sense, and sense of proportion. There was no motor trouble and no diplopia. There was occasional photophobia. Nausea was present with vertiginous attacks, which had numbered as high as twenty or thirty in a week. The temporal arteries were very much dilated, especially the right temporal artery.

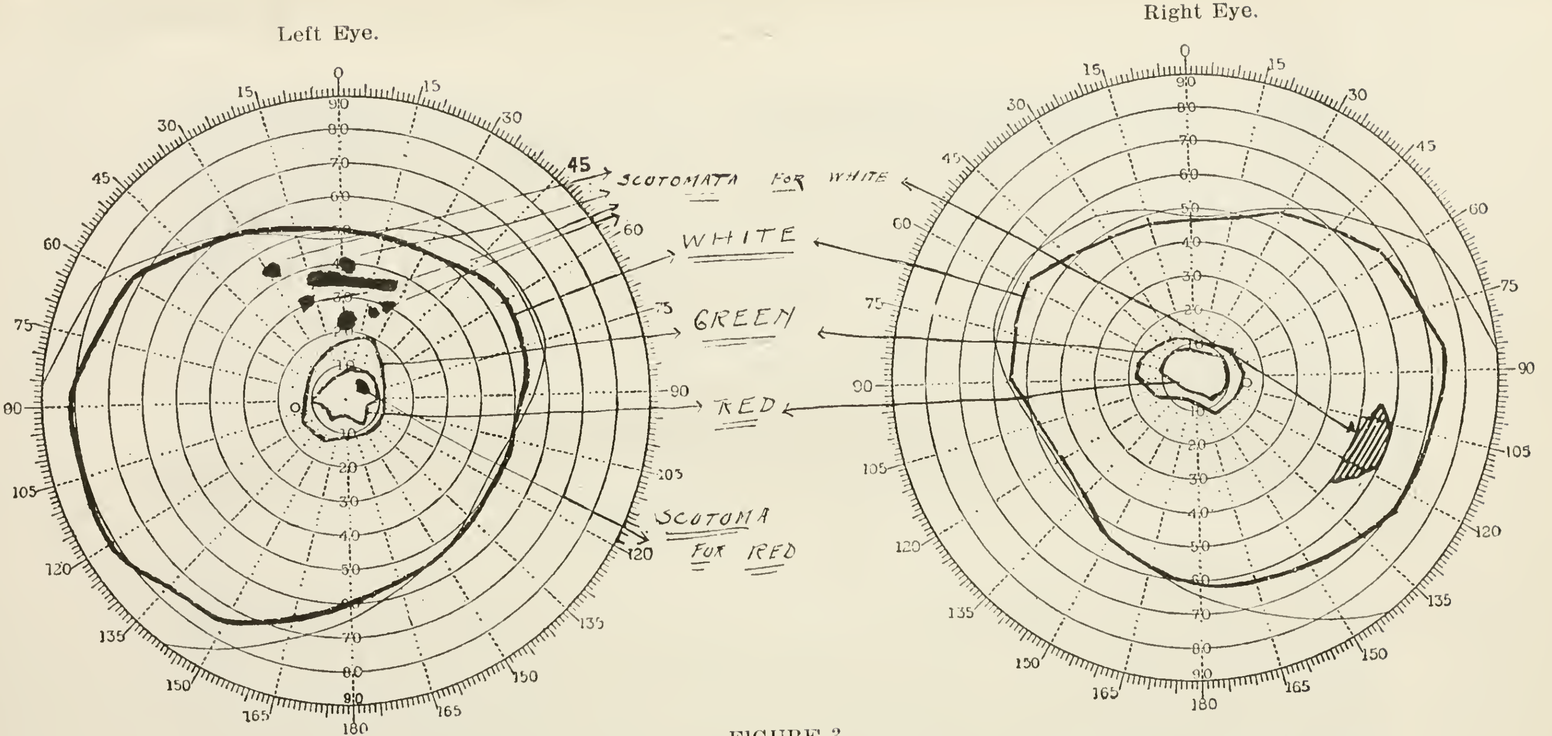


FIGURE 3.

First fields of case of optic atrophy incidental to intraorbital or intracranial neoplasm. Taken November 5, 1913.

Explanation of Fields.—There is no true field for red or green in the left eye until within twenty degrees of fixation. A larger field of indeterminate color may be made out, but the nearest approach to true color perception is indicated by the fields given. There is a paracentral scotoma for red within the red field. There is absolutely no central color perception for red or green, although the limits of this central scotoma cannot be defined.

In the right eye, color perception is greatly reduced, and there is a large relative scotoma for white in the periphery of the white field,

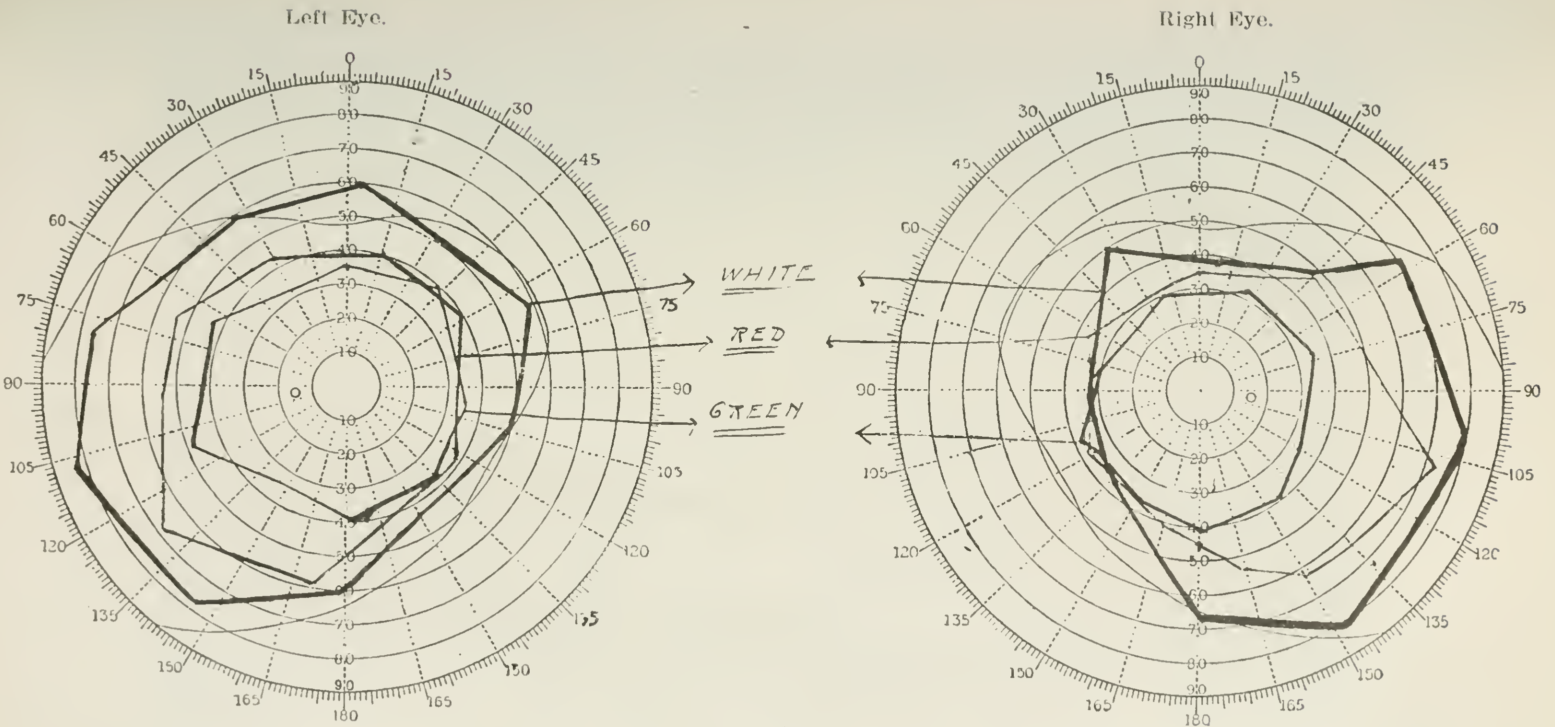


FIGURE 4.

Fields of case of optic atrophy incidental to intraorbital or intracranial neoplasm. Taken March 20, 1915, seventeen months later. Vision in right eye, 5/6; in left eye, 5/22.5.

Detailed examination of the muscle balance at this time showed nine degrees interni; nine degrees externi; one-half degree inferior recti; one-half degree hyperphoria, prism base up, right eye. No diplopia with candle test in the dark room.

The fields showed some interesting phenomena. The right eye showed normal field for white with a relative scotoma to the temporal side on the 120 meridian between 50 and 60 degrees. The red field was contracted to 15 degrees; the green within 10 degrees. The left eye showed a normal field for white with disseminated scotomata above fixation in segment 15 to 18 degrees. Green was irregularly contracted between 20 to 10 degrees. Red was irregularly contracted within 10 degrees with central scotoma. (See page 230.)

The fundus showed atrophic changes in the nerve, accompanied by pronounced enlargement of the retinal vessels, especially on the left side. At the first visit (November 1, 1913), the ophthalmoscopic examination showed the following conditions: In the right eye the optic disc was oval, of a pinkish white color, and well defined. There was a deep excavation to the outer side. Vessels, long axis minus 1.00 D. The arteries were normal in width, rather numerous; the light streak was normal; and numerous arterioles were visible in the fundus as the periphery was approached. The main veins were rather distended. There were no hemorrhages or fatty deposits.

In the left eye the optic disc was rather oval at 90 degrees, with its superior and nasal margins somewhat obscured, which obscuration could not be cleared away with the lenses of the ophthalmoscope. A central physiologic cup was discernible. There was present enormous distention and tortuosity and kinking of all the retinal veins, while the arteries appeared to be abnormally contracted. A small hemorrhage was present along the course of the inferior temporal vein. There was pronounced choroidal pigment to the temporal side of the disc. In both eyes the macula was normal. No edema of the retina was present in either eye.

Examination by Dr. C. C. Eves in the nose and throat clinic showed small frontal sinus on the right side, left sinus normal, no cloudiness. Transillumination was entirely normal.

The X-ray examination by Dr. Stewart confirmed transillumination, and further showed the sella turcica to be normal though small.

The laboratory examination showed Wassermann test negative and a blood count of leucocytes, 10,720; polynuclear, 77⅓ per cent; transitional, 3⅓ per cent; lymphocytes, 18 per cent; eosinophiles, 1⅓ per cent.

Twelve days after his first visit the left eye showed normal reaction to light, with normal consensual reaction on both sides. The ophthalmoscope at this time showed the retinal veins of the right eye to be enlarging.

Examination of the hearing showed the watch to be heard two inches from the right ear, and twenty-four inches from the left ear. The patient, however, complained of faulty hearing in the left ear, and "ringing" in the right ear. He also showed a tendency to fall to the left when the vertiginous attacks came on. His temperature remained normal throughout the course of the condition.

Investigation in the medical clinic by Dr. Godfrey disclosed the fact that the patient had been treated there two years previously for cardiac hypertrophy and relative incompetence of the mitral valve. There were no sensory disturbances. Knee jerks were both plus, and ankle clonus was present on both sides.

Despite the fact that the Wassermann test was negative, and on account of the increasing severity of the symptoms, empiricism was permitted to enter into the treatment of the case, and the patient was placed upon potassium iodid, grains five, three times daily, gradually increasing the dose.

Within two weeks the nausea, vomiting, headache, dizziness and vertigo were pronouncedly influenced. The dizziness disappeared entirely. Within the next two weeks all these subjective symptoms had disappeared. The exophthalmos and proptosis were less marked, but the distension of the blood vessels was still present. Symptoms of iodism demanded a reduction in the dose of the potassium iodid.

Five weeks after his initial visit our notes read that he had had an attack of dizziness the last week (corresponding to the period when the amount of potassium iodid had been reduced). Ophthalmoscopic examination showed in the right eye that the media were clear, the disc was oval at ninety degrees, scleral ring was all round, choroidal ring in and out, broken to the outer side; the veins were very full and more tortuous than normal and twice the caliber of the arteries.

Physiologic excavation of the disc was present. There were no hemorrhages or exudates. In the left eye the media were clear; the disc was irregular; the excavation was pronounced, small and tortuous vessels were present on the disc. Dark and tortuous veins, much larger than in the right eye, were seen emerging from the center of the disc; the arteries were contracted and were less than one-fourth the diameter of the veins, especially in the lower branches. In the periphery they were somewhat larger.

Potassium iodid was administered continuously, first in increasing doses, until symptoms of iodism required decreasing it, then for the most part in doses varying from five to fifteen grains three times daily in water after meals. Two months after our first observation his vision was: right eye, 5/45; left eye, 5/200. Vertigo and dizziness had practically disappeared and the proptosis and exophthalmos were markedly reduced. The left eye showed a marked diminution in the venous engorgement, although the arterial twigs were still quite large. There was a minute hemorrhage along the superior temporal vein anterior to the macula.

At the end of four months from the initial visit the right eye had still maintained its normal visual acuity, and the left eye had increased to 5/60. Hearing had increased to watch sounds before the right ear at two and a half inches, and before the left ear at two feet. His weight also increased. The patient had returned to his work, the vertigo and dizziness having been reduced to negligible proportions. The proptosis had nearly all disappeared. The pupils reacted freely to all forms of stimuli. The venous engorgement, so prominent in the other examinations, while still present in the fundus, was considerably less marked than formerly.

On looking further into our records we discovered that the patient had been under observation in October, 1911, two years previously (Vol. 1, No. 245). He then complained of dizziness and was refracted. The ophthalmoscope showed in the right eye no gross lesion but tortuosity of the vessels. In the left eye the superior nasal vein was quite tortuous. The other vessels were also tortuous but less marked. The veins were slightly irregular in course and depressed where crossed by the arteries. There was no gross lesion in either eye. Proptosis was absent.

Sixteen months after the initial examination for the present condition was made, the fields are found to be practically normal for white, red and green, with the exception of slight interlacing on the nasal side. There are no scotoma. Vision in the right eye was 5/6 and in the left eye 5/22.5, without correction. The exophthalmos and proptosis, so pronounced in the early stages of the condition, have disappeared, and the circulatory disturbances previously existing within the eye have subsided. The patient has continued at his work after his return to it already noted, and the subjective symptoms of dizziness, etc., are no longer experienced. (See page 231.)

OPTIC ATROPHY INCIDENTAL TO DISEASE OR FAULTY DEVELOPMENT OF THE PITUITARY BODY.

This is well illustrated by the case of J. M. B. (new record system, January 23, 1914). This patient was referred to us by Dr. H. G. Godfrey of the medical clinic, with the following history: The patient, a single man, stated that he was twenty-six years old, but appeared much undersized and more youthful than that age. About three months previously he had been under treatment in the hospital for subacute appendicitis, for which he declined operation, at which time it was noted that he conformed perfectly to the typus feminis of Froelich, now demonstrated by Cushing to be symptomatic of pituitary deficiency. Dr. Hooker, also of the medical service of the hospital, at this time suggested pituitary tumor. In the early part of the current year (1915) he returned for further observation, largely, however, because of failing vision.

His family history was negative, and his past medical history revealed only acute rheumatic fever early in life, and a successful hernia operation in 1908 in this hospital.

The medical history records (5509, Medical Dispensary—Dr. Godfrey, new system of records) that he has severe headaches that have lasted at times for five days accompanied by vomiting, and which have occurred at irregular intervals during the past three years. He first wore glasses three years ago. His sexual functions, which have never been active, have been in complete abeyance since his nineteenth year. For the past year he has been somnolent and listless. He has always been very tractable, and his mother thinks he is mentally deficient.

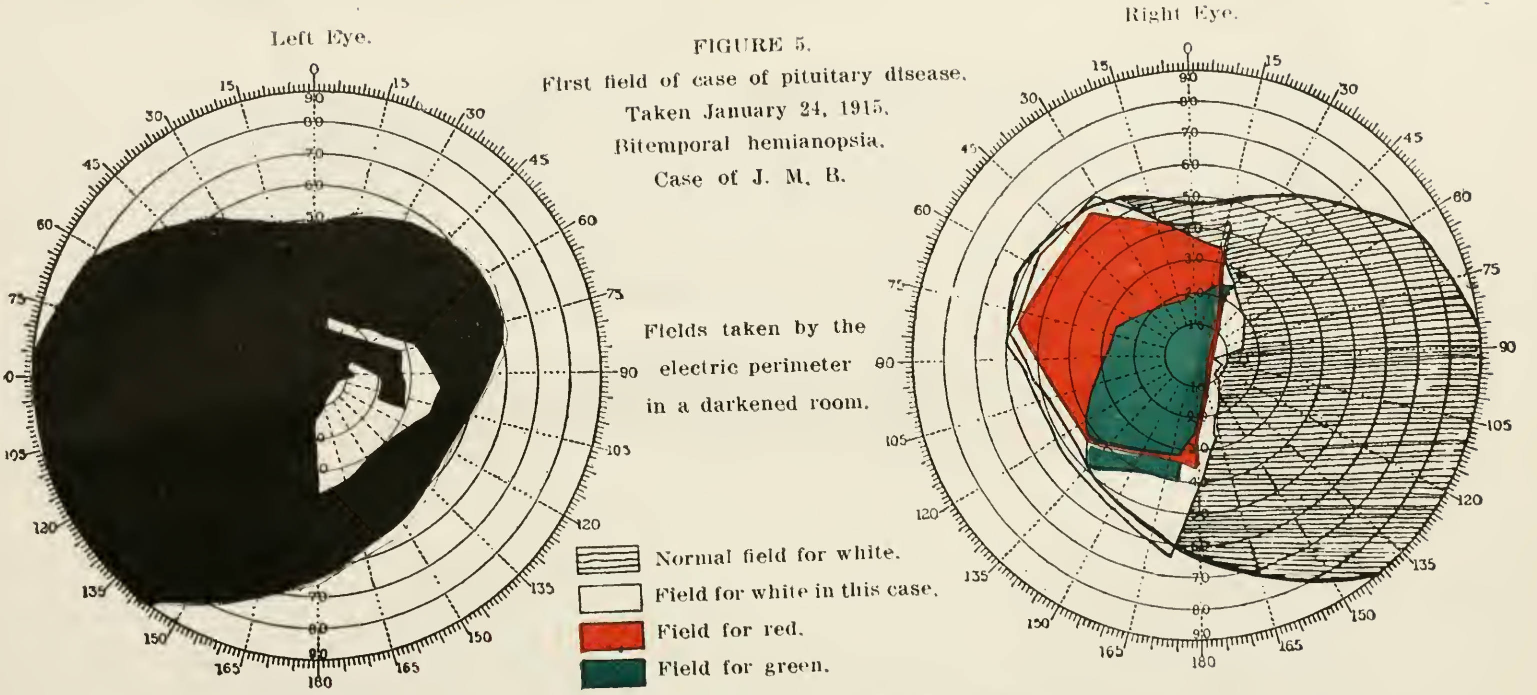


FIGURE 5.

First field of case of pituitary disease.
Taken January 24, 1915.
Bitemporal hemianopsia.
Case of J. M. B.

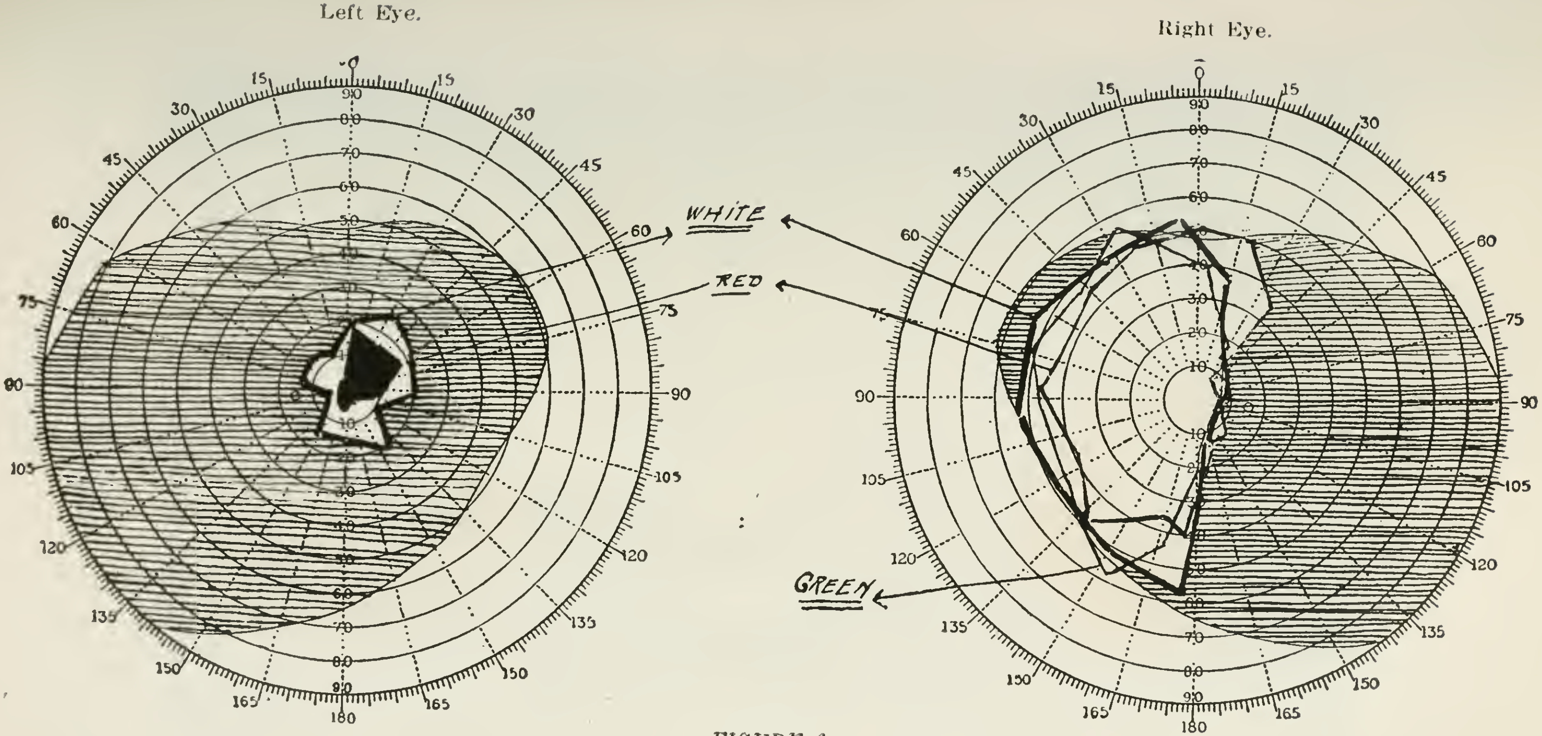
Fields taken by the
electric perimeter
in a darkened room.

- ▤ Normal field for white.
- ☐ Field for white in this case.
- 🟥 Field for red.
- 🟩 Field for green.

EXPLANATION OF THE FIELDS BEFORE OPERATION.

Right Eye.—No temporal field for white, red, or green. No scotomata. Interlacing of red and green fields. Vision 5/6 by two different test cards.

Left Eye.—No temporal field for white, red, or green. Contracted and distorted field for white, with encroachment of blind area into the field on the nasal side. No color fields. No scotomata. Vision 1/60, but only in the good part of the field. No central vision as in right eye.



Left Eye.

Right Eye.

FIGURE 6.

Second field of case of pituitary disease. Taken March 25, 1915, after operation. No green perception in right eye. No central scotoma. Vision in left eye, fingers at ten inches. Vision in right eye, 5/5 (?).

The past medical history as obtained in the eye service brings out the same facts, together with a few sociologic details that may have some bearing on the condition.

The patient's first occupation was in a plating mill where nickel and bronze plating by the electro process was extensively used. This was in Canada, where he worked for five years and two months. He was fourteen when he began work and over nineteen when he left. This work required contact with potash and with cyanid—no wood alcohol, gasoline, turpentine or benzine was used, as far as he knows of the work. He did not come in contact with lacquer, which was extensively used in the work. For the last four years he has been working in a carpet mill. Here it may be casually mentioned that the textile industries serve to render many latent optic nerve conditions manifest, as is readily shown by this survey of cases.

He had inflammatory rheumatism when three years of age, but never had diphtheria, scarlet fever, venereal disease, or in fact any condition other than occasional indigestion and the hernia previously mentioned, for which he was operated upon in this hospital six years ago and with good result.

The patient is unmarried, and looks like a lad of less than fourteen years of age. He commenced to have trouble with his eyes about three years ago, for which he attended St. Christopher's Hospital, and was prescribed glasses. About one year ago his sight began to fail rapidly, but he did not seek medical attention until within a few days of the first visit recorded in our notes. He has had pain in the head, "bilious attacks," stomach trouble, etc., from time to time, for which he consulted a physician. Divergence has been noticed only the last two months.

The physical examination showed the facies to be curiously bland and unlined. There is left divergent squint. Speech is slow, and response noticeably retarded. The hips are broad. The superficial fat is distributed over the pectoral, abdominal, and gluteal regions so as to give the body a typical feminine outline. The pubic hair is scanty. The chest, arms and axilla are hairless. The heart and lungs are negative. The systolic pressure is 110 millimeters, and diastolic 70 millimeters.

The laboratory tests show hemoglobin, 82 per cent; erythrocytes, 5,170,000; leucocytes, 84,000, differential count; polynuclear, 58 per cent; transitional, ⅔ per cent; lymphocytes, 41⅓ per cent. Serum Wassermann negative. Spinal fluid Wassermann negative—0.5, 1.0, 1.5 cubic centimeters used. Urinalysis: Amber color, acid reaction, specific gravity 1018, no albumin, no sugar, no casts, no crystals.

Skiagraph by Dr. Stewart of the X-ray department of the hospital showed destruction of the sella turcica, probably as a result of a tumor (Index number 3997A, January 27, 1915).

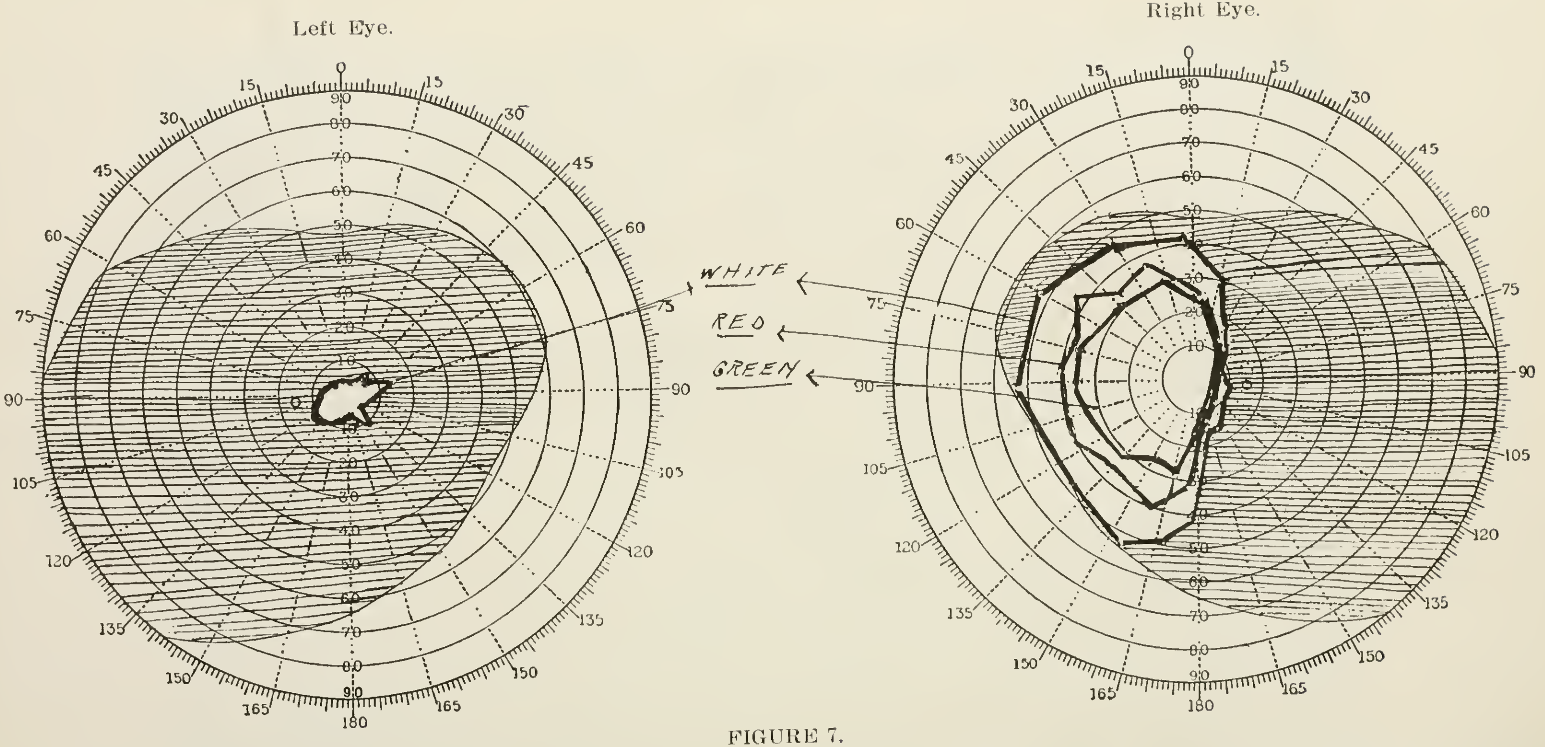
The ophthalmologic examination showed the eyelids, lacrimal apparatus, conjunctiva, tension, sclera, cornea, iris, anterior chamber, vitreous and lens to be normal in both eyes. Graefe's sign, Stelwag's sign, Moebius' sign, ptosis, exophthalmos and enophthalmos were absent.

The pupils were three millimeters in diameter, round, symmetrical, and equal. Both pupils reacted for light. The right pupil reacted promptly and freely for accommodation. The left pupil reacted during adduction of the left eye towards the median line and during accommodation, but on account of deficient vision in the left eye, the coordinate movement known as convergence was never present, and the pupillary reaction for convergence could not be determined. Consensual reactions were present in both eyes. Hippus, Argyll-Robertson reaction, and paradoxic reactions were absent. The Wernicke hemiopic reaction, as usual, was absent.

The patient's vision in the right eye was 5/6, taken on two different test cards, but in the left eye it was 1/60, but only in the good part of the visual fields. Examination of the fields in a dark room with the electric perimeter was good in the right eye, but greatly impaired in the left. (See page 236.)

The muscle equilibrium was fairly good, despite the divergence of the left eye. There was no nystagmus. The divergence in the left eye was not due to muscle defect, but to loss of ability to fix, on account of the pronounced visual disturbance. Adduction, abduction, elevation, depression, rotation, etc., were good for each eye separately, but there was no convergence in the left eye when accommodating for close range with both eyes.

Examination with the ophthalmoscope showed optic atrophy in the left eye, with atrophic changes in the right eye. There were no pronounced macular changes, but the retina was thinned out in the periphery. The choroidal vessels and pigment were also very prominent in the periphery of the fundus.



Left Eye.

Right Eye.

FIGURE 7.

Third field of case of pituitary disease. Taken April 13, 1915. Perception for white only in left eye. Vision in right eye, 5/5; in left eye, 1/60.

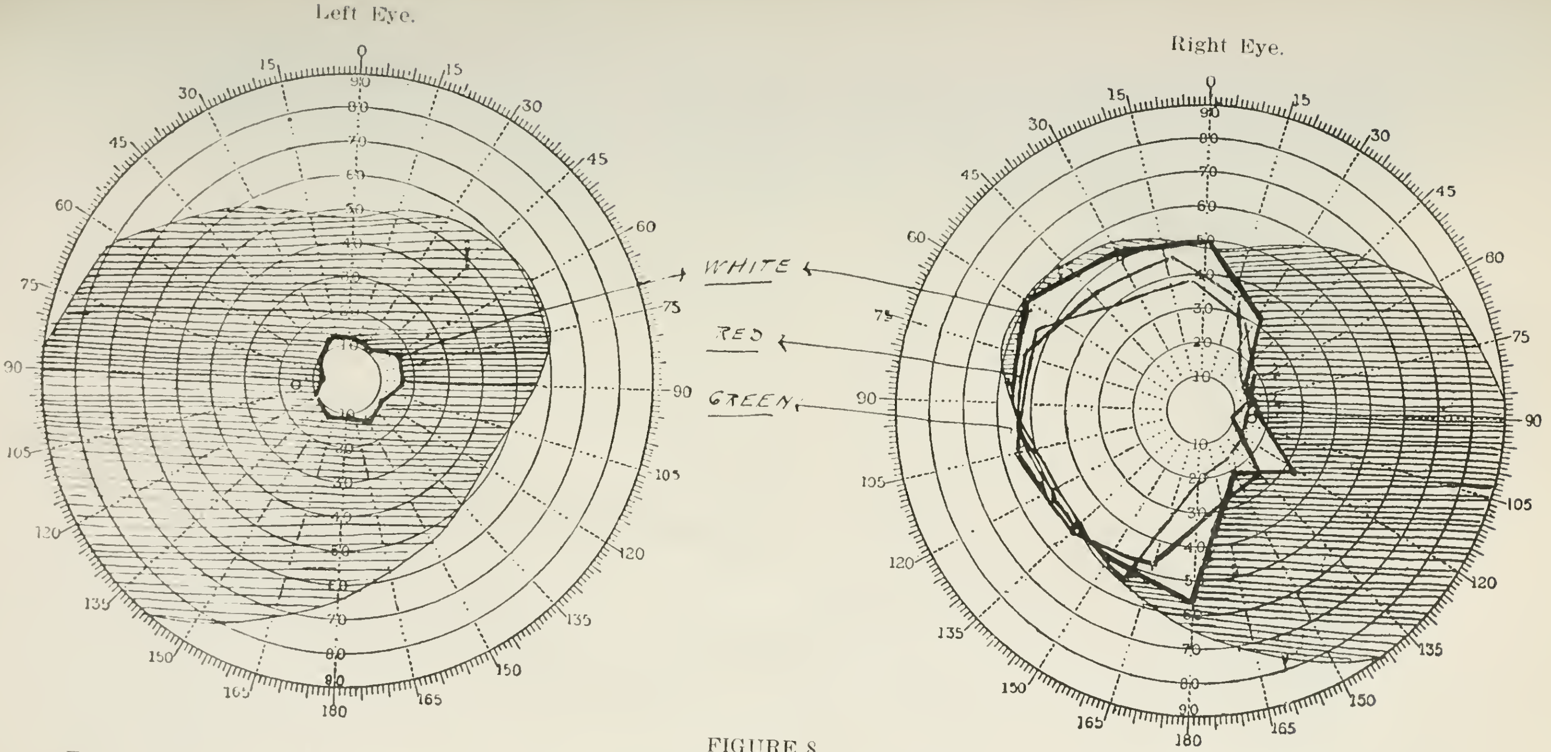


FIGURE 8.

Fourth field of case of pituitary disease. Taken May 8, 1915. Perception for white only in left eye. No scotomata in either eye. Vision in right eye, 5/5; in left eye, 0.5/45.

The sclera was nowhere exposed. All the vessels were somewhat contracted, and the main arteries were rather tortuous in both eyes.

The patient was subsequently operated upon by Dr. Charles H. Frazier, at the University Hospital, Philadelphia, February 20, 1915, by the transsphenoidal route, and the immediate recovery from the operation was very good.

After allowing sufficient intervals to elapse to note any complications, the patient was again subjected to a detailed examination on May 8, 1915. In general he felt much better than before the operation, and thought he could see much better also. The developmental changes noted before were uninfluenced by the operation. Nothing was noted externally in connection with the eyes except the divergent squint of the left eye and the slight asymmetry of the face, both of which were present before the operation. The patient at this time was in very good physical condition, and expressed a desire to resume work, having elected, during the period of his convalescence, to become a barber.

Examination of the fundus of the right eye showed the nerve to be white and atrophic, especially to the temporal side, but there was no pronounced cupping, although there was beginning choroidal disturbance in the periphery. The left eye showed pronounced optic atrophy but no cupping. The fundus appeared very much hazed, but there seemed to be no other gross lesion.

The pupils were three millimeters in diameter, equal and symmetrical. The reaction to light was good in the right eye, but retarded in the left. The right reacted to accommodation, convergence, and consensually. The left reacted to accommodation and consensually, but not to convergence, since there was no convergence of the left eye.

The gross muscle movements were normal, but there was no convergence of both eyes simultaneously. That this may occur in other conditions has been noted by Roemer* and others, the observation being that the tract for innervation of convergence may be affected independently of that which transmits the innervation for the lateral movements. In this case we believe the cause was peripheral rather than central, and depended primarily on the loss of vision incidental to the optic atrophy.

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*Textbook of Ophthalmology, 111, 607.

Otherwise we would have to assume the presence of a lesion in the crura cerebelli, in the pons, in the corporo quadrigemina, or in the optic thalamus, and we have no other evidence to support this.

The vision of the right eye at the time of this examination was 5/5, and at close range of thirty-three centimeters, he was able to read the 0.50 meter type. The left eye was able to identify the largest letter on the chart, marked for 45 meters, at one-half meter distance. The fields showed distinctive changes which are well expressed by the chart made on this date (vide). (See pages 237, 240, 241.)

XIV.

THE INTERNAL SECRETORY SYSTEM IN OPHTHALMOLOGY, WITH SPECIAL REFERENCE TO GOITER.*

Robert Scott Lamb, M. D.,

Washington, D. C.

Perhaps the title of this paper does not bring to you quite the story it brings to me, so I am going to try to tell you what it means to me, and ask you to reciprocate with a free and full discussion in order that we may learn something of this difficult subject which is so absorbing, and a knowledge of which is so essential, if we wish to intelligently handle some of our cases presenting themselves with symptoms of derangement and imbalance of the organs of the internal secretory system.

Before considering symptoms which may help us to identify the earliest evidence of lack of balance, let us glance at the composite picture presented by the various authorities upon the subject some years ago.

In 1881 Noyes describes, in his "Textbook on Diseases of the Eye," exophthalmic goiter, giving three cardinal symptoms: palpitation, hypertrophy of the thyroid, and exophthalmus, stating that any one of the three may be wanting. Then he mentions other symptoms: extreme irritability of the patient, flashes of heat, pallor and flushing of the face; irregular, thumping heart; pulse rate of one hundred to one hundred and sixty; some heart hypertrophy and systolic bruit, also bellows murmur over large vessels. He mentions von Graefe's and Stelwag's signs; also that mydriasis has been noted; movements of the eyes are unimpaired, diplopia is rare and transient, and vision is not involved. Then he gives a number of symptoms which evidently show that many intercurrent conditions connected with the case were suposed to be due to goiter. He records the greater frequency in women. His treatment is directed toward helping the heart with digitalis and general tonics and galvanism of the sympathetic of the neck, fluid extract of ergot and bromids; no particular treatment is directed to the exophthalmus, unless the cornea becomes too dry. This is the only gland considered in his book.

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*Read before the Ophthalmological and Otological Section of the Baltimore City Medical Society.

In 1884 Constantin Paul wrote a treatise upon the diseases of the heart in which, under "Basedow's Disease" (aneurismal bronchocele), he points out the three cardinal symptoms; the frequent occurrence in females associated with hysteria, neuralgia and uterine disturbances; nervous excitability and palpitation.

Some ten years later (in 1896) Fick on the Eye says, under head of "Exophthalmic Goiter," the three cardinal symptoms are rapid pulse, enlargement of the thyroid, and exophthalmus; pulse 100 or more, large vessels of the neck dilated, thyroid moderately enlarged, systolic murmur, variable exophthalmus; refers to Stelwag's and von Graefe's symptoms. Prognosis is doubtful—majority of cases recover after an illness of years; this is particularly true of women, who are more often attacked than men. In men, especially in advanced life, prognosis is unfavorable; there is an occasional acute course of the disease. Treatment consists of good physical nourishment, mental calm and life in the country or sanitarium.

Ten years later (1906) "Diseases of the Eye," by George de Schweinitz, adds to the symptoms of von Graefe and Stelwag those of Dalrymple and Moebius, and suggests possible sympathectomy for exophthalmus and partial thyroidectomy; he also suggests a possibility of optic neuritis following enlargement of pituitary body in acromegaly.

Fuchs' "Textbook of Ophthalmology," fourth edition, published in 1911) suggests, under the head of "Basedow's Disease," Stelwag's symptom, Moebius' symptom and Gifford's symptom; the exophthalmus, the swelling of the thyroid and tachycardia; under the head of "Diseases of the Optic Nerve" is one line relating to bitemporal hemianopsia, which he says most frequently occurs in enlargement of the hypophysis cerebri; with this is often associated the increased growth of the bones, the soft parts of the face, hands and feet.

Paul Roemer's "Textbook of Ophthalmology" (published in

1913), under the head of "Exophthalmic Goiter," gives what might be considered a very fair résumé of the ocular symptoms, including von Graefe's, Stelwag's, Gifford's, Mueller's, and Moebius' signs. And we have an even later publication from the American Encyclopedia and Dictionary of Ophthalmology, by Casey Wood (published in the year 1915), in which we get a discussion of numerous symptoms, including those already mentioned, together with Joffroy's and Kocher's; and as to acromegaly the statement is made that it causes bitemporal hemianopsia, ocular palsies and optic atrophy, together with headache, vomiting, vertigo, glycosuria, sexual disturbances, enlargement of the face, hands, trunk and feet. As to the suprarenalin glands, no mention is made of them except the suggestion that adrenalin be used in connection with operations.

Posey and Spiller in 1906, in "The Eye and the Nervous System," have correlated under "Exophthalmic Goiter" the most complete discussion I have found in any one volume. There are eight eye symptoms which I will discuss later. Under the head of acromegaly there is described, in addition to the exophthalmus, the possibilty of the enlargement of the eyeball, severe ocular neuralgia and nystagmus; that the irides may not react to light or that iridal rigidity may be present. Some visual disturbance always exists; the form and color fields may be concentrically contracted; instead of bitemporal hemianopsia, homonymous hemianopsia may be present—depending upon the direction in which the tumor grows. Half a page is devoted to differential diagnosis.

In 1909, in Osler's "Modern Medicine," part 2, under head of "Diseases of the Ductless Glands," Dr. George Dock writes at length upon these glands, referring from time to time to the ocular manifestations. However, I find in the literature generally very scant mention made of the importance of eye signs in connection with the ductless glands.

Regarding the glands of the internal secretions, a publication in 1914 (Stanford University, Lane Medical Lectures, 1913, by Sir Edward Schaffer, Regius professor of physiology, Edinburgh), gives a clear understanding of the present-day knowledge of these glands and their secretions.

The foregoing are fair examples of much of the information available at an early date; the five last mentioned are useful in establishing a basis from which to undertake an investigation of the subject of this paper.

From time to time in the literature there have appeared isolated instances in which it has been clearly indicated that the author was trying, through observation on a certain number of cases, to elucidate the problems of differential diagnosis from the ophthalmologist's viewpoint. My purpose is to bring to your attention the signs as recorded, and to offer suggestions regarding them, in order that we may the more clearly identify these cases of disarranged or disorganized internal secretory glands, thereby obtaining an early and correct diagnosis of the condition, together with the conservation of the health of patients and preventing them from having to undergo the severe sequelæ of belated diagnosis, resulting so often in chronic invalidism. You will agree with me, no doubt, my task is not a light one; and I have little assurance of succeeding against the tremendous odds and pitfalls in the pathway of one who attempts to bring order out of the chaos in which we find this entire subject. To some of you it may not be so thoroughly chaotic as it was to me, when, some time ago, through the appearance in my practice of a number of cases with obscure symptoms which forced me to undertake the journey into the field of general medicine which has to do with the study of the glands having an internal secretion and the symptoms incident to the pathologic changes in them.

At this point perhaps we will do well to refresh our memories for a moment regarding pupillary size; however, one need not, of course, in the presence of members of this society dwell on the matter; it suffices to say that from two and one-half to four and one-half millimeters is considered normal, though the average is probably about three millimeters; the size of the pupil fluctuating according to various stimuli—light, sensory, psychic, convergence, closure of the lids—somewhat with age; variations in refraction have some influence—hyperopes having small pupils, myopes large pupils; it is significant that Bumke has indicated that pupils dilate during exhaustion. May I be pardoned for taking entirely from Roemer (page 577) a description of the dilatation of the pupil through stimulation of the sympathetic?

"It has been known for a long time that mydriasis is caused by stimulation of the cervical sympathetic; the tract for this reaction is essentially as follows: the fibers that conduct the impulse of dilatation to the pupil leave the spinal cord at the level of the two upper dorsal and the lowest cervical vertebræ. They pass with the anterior branches of the ansa Vieusenii from the ganglion thoracium supremum to the ganglion cervicale inferius, and from this to the ganglion cervicale supremum through the cervical sympathetic. In this latter ganglion they form a junction with the hypoglossus. After leaving this ganglion they separate from the rami carotidei, which go to join the carotid plexus, and proceed within the skull to the Gasserian ganglion, where they unite with the first branch of the trigeminus, with which they reach the eye by way of the long ciliary nerves. These nerves do not pass through the ciliary ganglion."

May I be permitted to add that Fuchs' "Textbook of Ophthalmology," published in 1911, makes the following statement on page 370: "Cocain dilates the pupil—not, however, as in the case of mydriatics proper, by paralyzing the sphincter pupillæ, but by contracting the dilator. The dilatation of the pupil is, therefore, only a moderate one, and reaction of the pupil to light persists; moreover, mydriatics and miotics still produce an effect. If cocain is instilled into an eye the pupil of which has been dilated by atropin, the dilatation increases somewhat; hence the mydriasis produced by the simultaneous action of the atropin and cocain is the most considerable that can possibly be attained. The accommodation is not paralyzed by cocain, but only somewhat weakened.

"Besides acting upon the iris, cocain produces the following effects: The conjunctiva becomes very pale, and at the same time the patient has a feeling of cold and dryness of the eye. The palpebral fissure is more widely open and the act of winking is less frequent. Sometimes the eye is protruded somewhat forward and the intraocular tension slightly diminished. The practically important phenomenon, however, is the anesthesia shown by the superficial tissues of the eye. The effects of the cocain are best explained upon the assumption that it acts as a stimulant to the fibers of the sympathetic. The contraction of the vessels thus produced causes the pallor of the conjunctiva. The sympathetic also innervates the musculus tarsalis superior and inferior, and the dilatator pupillæ, and the contraction of these muscles causes the dilatation of the palpebral fissure and of the pupil. The anesthesia of the surface of the eyeball has nothing to do with the sympathetic, but depends upon the paralysis of the sensory nerves."

We next consider adrenalin, or adrenin; the extract of suprarenalin capsules stimulates the muscle fibers supplied by the sympathetic. Instilled into the eye it causes contraction of the blood vessels, while the dilatation of the pupil, due to contraction of the dilatator pupillæ, occurs in special cases only.

Lewandowsky says: "Certain of the plain muscles of the orbit and globe of the eye are also excited so that the eye tends to protrude and the palpebral fissure appears to enlarge; the third eyelid is retracted and the pupil widely dilated."

Adrenin also causes contraction of the pigment cells both of the skin and retina of the frog. It is noteworthy that sympathetic stimulation also produces this effect—at least this is so for the pigment cells of the skin. Although the rule is not entirely without exception, it may be stated as a general principle that the result of suprarenal injection is identical with that of stimulating the endings of the sympathetic nerves throughout the body (Langley).

Meltzer finds that adrenin is destroyed by cerebrospinal fluid. In the cat, Cannon found that dilatation of the pupils and upstanding of the fur which accompanying sudden alarm or excitement are associated with an increased outpouring of adrenin into the blood, and he has drawn attention to the fact that many of the phenomena which characterize violent emotional states (both in animals and man) are similar to those which are produced by excess of the suprarenal autacoid in the blood.

Ott and Scott state that various organ extracts produce an increased secretion of adrenin into the blood, viz., thyroid, parathyroid, pituitary, thymus, pancreas, testicle and ovary. On the other hand, the secretion of the adrenals has an influence upon many diverse organs and glands, including the other ductless glands, seeing that the autacoid secreted by the medulla activates sympathetic nerve endings throughout the body.

Regarding disorders of the pituitary body Cushing says: "The primary enlargement is usually first recognized by diminution of the visual field, caused by the pressure of the enlarging gland upon the optic chiasma; hence these affections generally come first under the notice of the ophthalmic surgeon. The relationship of the pituitary to other glands is more extensive than that of any other internally secreting organ. The effect of the extract upon the blood vessels is a direct one, and is not due, as in the case of the suprarenalin autacoid, to its stimulating action on the sympathetic.

Much could be said regarding the other glands of the internal secretory system; suffice it to say that for our purposes the foregoing should cover the subject to date.

As is apt to be the case with most of us, we see things indefinitely over a long period of time before our attention is riveted upon some point and the facts begin to crystallize themselves in our minds; and so it was with me, when, on a crisp December morning, one of my patients, after a brisk walk of about a mile, came into the office, buoyant, invigorated, and said how well she was feeling, and five minutes afterwards lay stretched out on the couch, apparently dying. Her pulse could not be counted at the wrist, but only at the carotid; she was cold—hands and feet seemed to have no life in them; and, as she herself described the condition, she could feel the cold creeping up toward her heart. After stimulation she rallied; breathing subsided from 60 to 40, and the pulse came back in the wrist and was counted at about 150. She remained there during the day, and I had one of my friends, a general practitioner, come to see her. It was fortunate for me that he had devoted a good deal of time to the study of the thyroid and thymus, for he was immediately suspicious of the case being one of complicated thyroid. We put her in the hospital for five weeks, during which time there was opportunity for study, and she was under observation for several months. Surely this case was sufficiently forcible to attract one's attention definitely to the possibilities of eye signs in connection with diseases following disorders of the internal secretory system; and I should like to call attention to some facts in connection with the case, which, in the light of subsequent information, have a definite meaning.

Miss G. D., white, age 23 years, came to me August 8, 1911, complaining of headache. At that time the pupils were well dilated—about seven millimeters. She had a compound myopic astigmatism with an exophoria of one and one-half for distance and an exophoria of twelve for reading.

In May (two years later) she came back, and I found not only the above symptoms, but a chorioretinitis with a slight increase of the amount of astigmatism in left eye; because of the chorioretinitis she was given dark glasses. In the fall, because of a recurrence of headache, she was sent by mail a prescription for pilocarpin and dionin; this she continued to use four months until she returned to Washington, January 19, 1914, when she was given dionin five per cent and mercury ointment to rub on temples. The headaches continuing, it was hoped a turbinectomy might help the very much congested turbinates and relieve the dyspnea; so a turbinectomy was done on the 25th of February, 1914. Her general condition became somewhat better and the headaches subsided; however, from time to time the headaches would reappear and she had to continue using the eye drops and mercury friction. Her pupils at that time were so large that the color of the iris could hardly be seen; there was a continual chorioretinal change and continued headaches, and she was given for outdoor use a "Hallauer" 67 glass, continuing to use the "Hallauer" 64 indoors. O. D., — 1.38 S. ○ — 1.50 c. ax. 5°; O. S., — 1.62 S. ○ — 2.50 c. ax. 180°.

When she returned to Washington in November, 1914, having in the meantime come across some cases in which blood pressure and intraocular hypertension were concomitant, I decided to take her tension. I found both eyes equal—eighteen milligrams; the blood pressure was one hundred and thirty, although she weighed only about one hundred and five pounds. She was put on sodium iodid in increasing doses at this time. It was, as I before stated, about a month later when she had her first definite collapse (which was doubtless precipitated as much by the iodid as the walk) and she was a good deal of an invalid for some months after her departure from the hospital. Up to the time of collapse I may say there was never any visible thyroid, nor any suspicion of a thyroid.

She has enlarged tonsils, but her health has precluded the advisability of their removal: and she is in Southern California for the winter, where the exigencies of life are not so strenuous.

Another patient, E. L., age thirty-six years, first came to me February 14, 1914. Under a cycloplegic she showed a small compound myopic astigmatism in the right eye, and a simple myopic astigmatism in the left; an esophoria of three for distance and an exophoria of seven and one-half for near; had markedly dilated pupils and headache. She had an active chorioretinitis in each eye; weighed about one hundred and eighty pounds. To the finger the tension was perfectly normal. I did not take it with instruments. The same may be said of the blood pressure. I did not at that time take the pressure. I put her on pilocarpin and dionin and mercury friction to the temples. On account of an ischemia of the retina a blood examination was made, which showed 6,000,000 reds, 9,000 whites and a hemoglobin of 60 per cent (Dare). Three months later the hemoglobin was 70 per cent. Then she passed out of observation until September, when she was seen a few times. At that time the reds showed 5,320,000 and the whites 8,000, and hemoglobin 90 per cent. I may say on the first count the small lymphocytes were too numerous; subsequently, since passing from observation, I have heard from her folks that the socalled spells her previous history had indicated had developed into an acute mania, and she was later removed from her home in West Virginia to Shephard and Pratt Institute here in your city, where I understand she now is.

Looking back over this case, I feel it was probably one of a thyreothymic type, although at the time it was not recognized as such. Perhaps some similar cases may be recalled to your minds, of compound myopic astigmatism, markedly dilated pupils, with fundus changes, prominent eyeballs and severe headaches.

These are two of a number of cases which led me to believe that if a definite investigation were made, some signs might be noted which would be of assistance in determining an early diagnosis. Therefore, I selected these few signs which pointed to a possibility of a disturbance of the internal secretion hereafter noted, together with those signs which had been reported as possibly better identified with exophthalmic goiter. I shall put these down in the order of the frequency of their occurrence.

First, the sign which I afterwards learned had been described by Knies, dilated and unequal pupils which respond to light very quickly; this is accompanied by eyeache as well as severe headache, and by chorioretinitis which is usually worse in the eye in which the pupil is more widely dilated. This inflammation is more marked in the macula region of the more inflamed eye. I have also noted here a low grade ciliary congestion which can easily be identified with a loupe, and which is worse in the eye of the more dilated pupil. I may say that in my experience the left eye is usually more affected. There may be lacrimation or a dryness of the conjunctiva, and there is a marked tendency to exophoria.

The next to appear is Dalrymple's sign, which is the retraction of the upper lid with consequent widening of the palpebral fissure. After this comes Mueller's sign, which is equivalent to Dalrymple's, except that he includes the lower lid retraction.

The next is Kocher's, which is, that if the patient fixes a stationary object, retraction of the upper lid occurs. (I would add in my experience both lids retract partly.) And if again an object be fixed which moves briskly up and down, a convulsive momentary retraction of the upper lid may occur.

Next comes Stelwag's sign, which consists of diminished frequency of, or imperfect winking, or a rapid succession of recurrent winkings may be followed by a long pause without winking. In patients without exophthalmos but with mental signs associated with goiter, Hömen's or Rosenbach's sign, tremor of the upper lid, is present.

Then appear one or more of the following signs, and sometimes all of these signs are present: they are Joffroy's—that when a patient with Graves' disease holds the head down and attempts to look up without raising the head, the forehead remains smooth. Moebius' sign—a deficiency in, or maybe a complete loss of, convergence power. Gifford's sign—that there was retraction and rigidity of the upper lid, making it difficult of eversion. Von Graefe's sign, which consists of the want of proper coordination between the upper lid and the eyeball when the latter is rotated downward. Aschner has found that by making pressure upon the eyeball the pulse can be made slower. Loewi has suggested that adrenin dilates the pupil in these cases. I have rarely found it.

On the morning of November 6, 1915, I took two cases: one with a known acute exophthalmic goiter, another with arteriosclerosis; in the first case there was with Hertle's exophthalmometer an intertemple of 115, right eye twenty-four millimeters, left eye twenty-five millimeters. Pupil of right eye, four and one-half millimeters; pupils of left eye, five millimeters. There was a chalazion of right upper lid; motion good in all directions, ciliary congestion, blepharitis and edema of the nerve head; no hazy vitreous, retina very pale; there was a disturbance of the pigment coat and small macular exudative spots, especially marked in the right eye. The tonometer showed tension of twenty-five in each eye.

The patient with high blood pressure and pain in left eye, worse in bright light, had an intertemple of 115; right eye twenty, left twenty-three; tonometer each twenty. The intraocular findings were a hazy vitreous with edema of retina and nerve head, and marked angiosclerosis. In the first patient all eye signs above recorded were present, in the second case all were negative.

I may say the patient with all the signs present has had an operation upon the thyroid by one of our local surgeons, following which the headache was excruciating; later thymic symptoms were troublesome.

When one's attention has been brought to this subject, as mine has been, many cases which would otherwise have been overlooked have come, after closer observation, and the tests of the various eye signs above indicated, to be recognized as being caused by derangements of the glands of internal secretion.

In order that I might not burden you with a long list of these patients and the findings, I have recorded the signs as indicated above in the order of their frequency as I have found them. I have been astounded at the number of these patients, for almost every day in the clinic at least one or two new cases are found; and from my own private practice I have been able this fall to send a number of cases to one of the general practitioners for observation and data regarding the confirmatory general symptoms. The case histories, and those bits of information gleaned by very careful observation on the part of the general practitioner would fill a volume.

It may be well to consider a few cases which are typical of many others: H. D., age twenty-nine years, employee Bureau of Engraving and Printing, came to me August 3, 1915, with dilated pupils, chorioretinitis and severe headache. Given pilocarpin and dionin, and mercury friction to the temples; she was terribly nervous, palpitation of heart, got very tired and had markedly enlarged thyroid; patient had compound hyperopic astigmatism of low degree. All symptoms disappeared except enlarged thyroid from which an adenoma has been removed this fall. At the time of operation there was much trauma to the thyroid, and following operation there was a return of the headache and other eye signs.

Miss F. M., age forty-four years, companion, above recorded as having all eye signs, an acute thyroid which has been operated on.

Miss D. S., age thirty years, clerk Patent Office, came to me October 27, 1915. Exophthalmometer: O. D., 24; O. S., 24; intertemple, 115; blood pressure, 125; given pilocarpin and dionin, and mercury friction; had an esophoria of 2 for distance; exophoria of 8 for near; severe headache, chorioretinitis each—worse central; pupils dilated; positive signs, Kneis, Stelwag, Dalrymple, Moebius and Kocher; negative signs, Joffroy, Gifford, Loewi and Aschner. Will be operated on this month after irradiation of thymus; thyroid immense. Now wearing slight compound hyperopic astigmatic correction, "Hallauer" 64, with an added + 0.50 for near because of asthenopsia.

Miss B. M. H., age twenty-eight years, clerk Treasury Department, came to me August 11, 1915. Blood pressure, 123; hyperopic astigmatism; exophoria 4 for distance and exophoria 15 for near; headache, chorioretinitis each, and unequal and dilated pupils. Gave her pilocarpin and dionin, mercury friction to temples, and icebag for throat each night. When last seen, November 29th, felt fine, and claims she runs home from station—in one of our suburbs—a distance of about half a mile, just for the exercise. All symptoms have disappeared; patient practically normal again.

Miss F. I. B., age, thirty years, stenographer, came to me September 23, 1915. Had typical headache, unequal and dilated pupils, hyperopic astigmatism + 1.12 D. c. ax. 90° each; given pilocarpin and dionin, mercury friction to temples, and icebag to throat at bedtime. Last seen November 29th; patient had quite recovered.

Miss E. L. S., age twenty-seven years, telephone supervisor, came to me October 22, 1915. Severe headache; optic nerve, right eye, shows with perimeter contracted fields, slight involvement; ophthalmoscope shows edema of nerve head and retina in both eyes. Given for local use pilocarpin and dionin, mercury friction to temples; pupil in each eye five millimeters. Exophthalmometer: right eye, 17; left, 17; intertemple, 108. Evident thyreothymic case, and turned over to a general practitioner. Local treatment for nerves, strychnin injections to temple, and above drugs, together with protection against light. General condition deemed so serious as to need first consideration.

Mrs. J. J. L., age twenty-three years, housewife. Operated on seven years before for goiter for cosmetic reasons; never had symptoms until after baby was born, two years ago; came to me for excruciating headache and eyeache; pupils unequal and dilated; chorioretinitis present, worse macula of left eye. Pilocarpin and dionin, and mercury friction. Definite thymus; headache very much improved; has had thymic irradiations.

Mrs. M. D. R., age thirty-four years, housewife. Sent to me August 20, 1914, suffering with acute contagious conjunctivitis; returned of her own accord August 2, 1915, complaining of excruciating headache, for which she had been treated by general practitioner with injections of sedative or hypnotic from time to time. Tension right eye, 23; left eye, 27; given pilocarpin and dionin, mercury friction to temples, and icebag to throat at night. Sent to gynecologist in view of fact headaches were worse during menstruation; report relatively negative—not sufficient cause. Got consent of first practitioner to submit patient to physician with whom I had been collaborating; definite thyreothymic symptoms reported; patient advised to take rest in Atlantic City under direction of general practitioner.

A daughter of this patient, A. R. R., age nine years, came to me June 1, 1915. Compound hyperopic astigmatism; prescribed under cycloplegia + 3.0 S. ○ + 0.38 c. ax. 105° right eye, and + 1.50 S. ○ + 0.38 c. ax. 105° left eye—“Hallauer” 64—together with a + 0.50 added for near glass because of asthenopia; this patient is definitely thymic, as shown by X-ray as well as other symptoms, and has been turned over to a general practitioner for rest in bed and other treatment.

I have the records of numbers of children with chorea, as in the case of A. R. R.; they have been brought to me for severe headache and for twitching of the lids, and sometimes of the face. Each of these cases has shown signs of goiter; they have had tonsillar trouble, and some few, very bad teeth. Some have had to be taken from school for a year for complete rest, myasthenia being one of the most marked symptoms in each case.

It may be well to consider two cases which had exophthalmus but no evidence of internal secretion imbalance.

Mrs. G. B. R., age thirty years, housewife, came to me November 22, 1915. No headache—diplopia; exophthalmometer showed an intertemple 115; O. D., 25; O. S., 26; pupils: O. D., 5; O. S., 6½; positive eye signs—Knies, Dalrymple, Kocher and Moebius; hyperopic astigmatism; given under mydriatic + 0.62 c. ax. 52½° right eye, and + 1.0 c. ax. 127½° left eye —"Hallauer" 64. Right hyperphoria of one-half for distance; left esophoria of one and one-half; right hyperphoria of one for near and an exophoria of ten. This patient had a slight chorioretinitis and edema of the retina, but no headache; she had had two operations upon her eyes some two years before.

R. M., age forty years, came to my attention some days ago when I was called to one of the hospitals to see a case which was suspected by an internist of being one of exophthalmic goiter; she died the next day. The exophthalmus was present, but the symptoms which I have found to be connected with these cases were not present. She had a very marked vitreous haze and edema of the nerve and retina; her breathing was extremely shallow, and it was due no doubt to the edema of the lung, accompanied by a heart lesion which was said to be mitral stenosis and acute dilatation. The history included an occasional headache of a throbbing character.

I should be glad to cite to you case after case, but it seems we have been over a sufficient number of cases to warrant a few remarks or comments in regard to the findings.

1. The majority of symptoms can be explained by oversensitization of the tissues by the thyroid hypersecretion appearing in the blood, and in the presence of adrenalin chlorid producing a very definite excitation to the sympathetic nerve endings or "plates of Langley." This includes, of course, the pupil dilatation, contraction of the musculus tarsalis superior and inferior (Mueller's muscle) and also Landstrom's muscle.

2. After a period of overexcitation and stimulation there is, of necessity, a fatigue, and some of the eye signs are undoubtedly those of fatigue, such as lack of convergence, exophoria and asthenopia, ciliary congestion or the congestion of episcleral vessels.

3. As to the chorioretinitis, I have been a little in doubt as to its being due to some direct effect of the adrenin on the pig-

ment cells, or whether it was due to exposure, because of dilatation of the pupil over a long period of time, or both.

4. In some of the fatigue cases I am satisfied there is intraocular tension; the exophthalmus is undoubtedly a late manifestation, as is also the tremor of the lids; however, this is earlier than the exophthalmus.

5. In these cases of tremor the pupils are never so widely dilated because the stimulation is evidently of a craniosacral character rather than sympathetic.

As to the headache, which is an early symptom, it is characteristic; yet I have been unable to find any mention of it. In its milder form it occupies the region of the temples, eyeballs, and extends toward the top of the head. Besides the heaviness there is excruciating pain. However, the more severe type, which is usual, is that in which this pain extends on over the vertex and down the nape of the neck into the shoulders. The characteristic feature is its occurrence within a few minutes of any shock, stress, strain or prolonged overexertion, and continues throughout the day and night and on until treated by sedatives or hypnotics, or until the rest in bed and freedom from further excitation wears out the stimulating endocrine substance.

I find I can get control of it rather well with pilocarpin and dionin, but I am not prepared to explain its cause. I have thought it might be due to the determination of blood to the small vessels, as for example, the flushed face; there may be a similar stagnation in the circulation of the orbit and eyeball. The pain is probably pressure pain.

One of the most important things to the patient is relief from the eyeache, headache and discomfort on exposure to light, and they, naturally, seek the oculist first because of the eye symptoms. In fact, I am satisfied, from the experience I have had, that we see these cases again and again over a period of several years before the general manifestations of the disease are sufficiently remarkable for the family or friends or general practitioners to take any notice; and it seems, therefore, a duty that we investigate these cases and bring them to the attention of the practitioner early, in order that remedies may be found which will not only alleviate the symptoms present, but prevent the occurrence of other and more serious complications which usually arise.

Because of whatever familiarity I may have with these cases, owing to a study of some of the literature upon internal secretions, I was enabled to find a case of acromegaly: a young man, J. B., age seventeen years, who came to the clinic and was picked out by one of my assistants as a probable thyroid case on account of the swelling of the neck. Because I found part of the swelling was due to enlarged cervical glands and the other swelling was due to an unusually large, almost double normal sized larynx and trachea, together with slightly dilated pupils and bitemporal headache, I was led to take the fields, and was rewarded by finding bitemporal contraction, although not complete hemianopsia. He was referred to a general practitioner and a neurologist for observation and therapy.

I am not sure that I have succeeded in my effort to bring to your attention sufficient data to warrant me in claiming anything new or original in this work; if, however, it has pleased you to extract from my discussion of this subject anything new or profitable, or anything which you can use for the benefit of your patients or yourselves, I have accomplished all that I could hope for.

I submit to you a table as a guide for further investigation, and suggest that the tests be made in ordinary daylight, because of a wider range of application in office or clinic.

Name ....
Address .... 19........
Earliest:
    Knies ....
    Eyeache ....
    Headache..............part of head..................................
    Chorioretinitis—O. D....................O. S....................
    Ciliary congestion—O. D...................O. S...................
    Asthenopia ....
    Lacrimation ....
    Dryness ....
    Exophoria ....
Early:
    Dalrymple ....
    Mueller ....
    Kocher ....
    Stelwag ....
    Hoemen or Rosenbach..
Late:
    Joffroy ....
    Moebius ....
    Gifford ....
    Von Graefe ....
General:
    Aschner ....
    Loewi ....

May I call attention to the fact that we are now trying to classify our cases under a number of headings: (1) Goiter secondary to focal infection; (2) sympathetic sensitization with no toxic symptoms; (3) hyperthyroidism of the red type or sympathicotonic; (4) hyperthyroidism of the pale type or vagicotonic, with pigmentation and myasthenia; (5) true exophthalmic goiter, with or without a thymus; (6) intermittent hyperthyroidism appearing in adenoma or other tumor; (7) recurring hyperthyroidism arising in association with hypertrophy of a postoperative fragment; (8) thyroiditis in children with chorea and a nonatrophic thymus; (9) cases of thymus hypertrophy in Addison's disease.

Before closing I should like to express my thanks to Dr. Edward Hiram Reede, who has given me thorough cooperation in the study of these cases from the viewpoint of the internist. I thank you for the honor you have done me in asking me to speak before your society.

XV.

PERIMETRIC STUDIES OF THE NORMAL AND PATHOLOGIC BLIND SPOT OF MARIOTTE.

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Studies of Mariotte's blind spot have been made by van der Hoeve, Hansell, and others, and they all have practically been in acord as to the approximate size and location of this blind area in the perimetric field. Van der Hoeve and Hansell measured the vertical diameter at 7° and the horizontal at 5°; and with few exceptions the blind spot has been located approximately at 15° from the fixation center, and a little below the horizontal meridian. These figures, however, in the minds of most of us do not take on concrete form, because the blind spot is not charted on the campimeter or perimeter, and its location is indifferently marked out on perimetric charts by a small circle which bears no definite relation to its exact size. The inexperienced examiner, therefore, has nothing with which to measure or to determine abnormalities in the blind spot.

In the hand campimeter of the author[1] this difficulty has been overcome by definitely charting the average normal blind spot at a 16.5 cm. radius, the average having been drawn from several hundred examinations. The vertical diameter is 21 mm., and the horizontal is 15 mm. The average distance of the center of the blind spot to the center of the field of fixation is 45 mm. Reduced to degrees, by the rules of trigonometry, the blind spot is 7° 40′ in vertical diameter, and 5° 28′ in horizontal, and the distance from the central fixation point to the center of the blind spot is 15° 49′. Given these figures, it becomes an easy matter to definitely determine the size of the blind spot at a radius of thirteen inches or one-third meter, at one and two meters, the distances usually employed, or at any other distance desired. At thirteen inches or 33 cm., the blind area should measure 31.5 mm. by 44 mm.; at one meter, 95.27 mm. by 133.41 mm.; at two meters, 190.54 mm. by 266.82 mm. The distance from the fixation center should be 9.3 cm., 25.8 cm., and 54.5 cm., respectively.

If care is observed to have the patient's head erect and the campimeter is properly in relation to the eye, the variations at a 16.5 cm. focus are very slight indeed. The vertical diameter extends 2° above the horizontal meridian of the chart and approximately 5° below. This naturally can be made to vary by slight tilting either of the head or of the campimeter.

In the size of the blind spot, possibly the greatest variations occur in the vertical diameter. In a few instances I have found the vertical diameter reduced to 5°. In measuring the normal, and more particularly the abnormal, blind spot there is a tendency on the part of the patient to develop an enlargement on the nasal side of the disc. There probably are two reasons for this tendency. The retina between the macula and the disc undoubtedly is richer in rods and cones than the area to the nasal side of the disc, and as the test object is moved from the macula towards the periphery, the difficulty of recognizing colors increases. On the hand campimeter, for example, a disc of less than 2 mm. in diameter will hardly be recognized with any degree of accuracy beyond the 20° circle. A second factor in enlargements to the nasal side of the disc is the fact that the retinal nerve fibers are largely bunched on the nasal side, and although translucent in health, in edema of the disc from any cause, the rods and cones on that side may be unable to receive clear impressions because of the edema. The nasal edge of the blind spot, therefore, must be investigated with a great deal of care in order to determine the exact limits.

The second physiologic variation of the blind area will be found in the distance of the blind spot from the fixation center. The average distance is 15° 49′. In myopia this distance is increased. In high hypermetropia, on the other hand, the distance is somewhat less. The exceptions, as a rule, are at a greater distance than 15° 49′, rather than the reverse.

In a study of the blind spot, most accurate results are obtained at a close range, especially in the study of colors. The average individual is neither so careful nor capable of making minute distinctions at one and two meters as at one-sixth and one-third of a meter. It is true the index of error increases as the distance of the eye from the board decreases, but to offset this error, color values are less distinct, and the point of full saturation becomes more uncertain as the distance of the eye from the board increases. I have personally tried my own blind spot and the blind spot of medical men, who understand what is expected of them, at one and two meters, and have rarely been able to obtain uniform results. On the other hand, at a 16.5 cm. radius, little variation is noted and errors are more quickly corrected. Taking the blind spot at two meters is difficult under the most favorable conditions, and accuracy is increased as the distance of the eye from the campimeter is diminished. The correctness of this observation has been verified by many examinations, not only of the blind spot, but of the color fields in the central zone as well. The studies which are incorporated in this paper, therefore, are based on examinations at a 16.5 cm. radius, or six and one-half inches.

Van der Hoeve and others found an area surrounding the normal blind spot in which there was a qualitative color change —an indistinct scotoma for colors. The area averaged about 1° in width. This observation I have not been able to confirm, either in studies of my own blind spot or in studies of normal individuals. Such a condition is possible when the examination is made at one and two meter distances, but the recognition of colors in discs small enough to make accurate and sharp discriminations at these distances is too uncertain to furnish trustworthy evidence. When this indistinct zone, therefore, is present at a radius of 16.5 cm., it is valuable and conclusive evidence of pathologic change in the optic nerve.

Careful studies in the normal individual show a blind spot sharply defined both for form and color and of the same size for form and colors. When, however, the optic nerve becomes the seat of disease, the first evidence will be found to be a qualitative color loss, second a quantitative loss, and finally absolute enlargement of the blind spot.

It is pertinent to inquire what is the real cause of an enlarged blind spot. Although it is a question large enough to form the basis of a future paper, a brief résumé is essential to complete this paper.

Van der Hoeve believes it means an involvement of the peripapillary bundle of nerve fibers wherever they are located. Fuchs believes the peripheral fibers of the optic nerve supply the retina immediately surrounding the disc, and the central fibers of the nerve supply the peripheral retina. It is well to bear in mind the fact that enlargements are, for the most part, concentric when due to retrobulbar conditions. If this be true, in accessory sinus disease it would argue against the peripheral arrangement of the peripapillary nerve fibers and would indicate a more compact bundle, most of whose fibers could be simultaneously involved. It is significant, too, that in most true toxic amblyopias there is a central scotoma and an enlarged blind spot, or a scotoma including the macula and Mariotte's blind spot. The peripheral field is rarely involved. This likewise would tend to locate the peripapillary fibers close to the papillomacular bundle. Clinical data seem to locate the temporal fibers of the retina in the temporal part of the nerve, and other parts of the retina in corresponding and definite parts of the nerve, even as far back as, and posterior to, the chiasm. It is probable, therefore, that in true retrobulbar neuritis, enlargement of the blind spot is due to involvement of the peripapillary nerve fibers, or to disease of the ganglionic cells which form a part of the neuron. Although anatomic and histologic investigation seems to confirm Fuchs' idea of the distribution of the peripapillary nerve fibers in the periphery of the nerve, clinical evidence does not conclusively confirm these findings. It is probable that the peripapillary bundle of fibers is located in the periphery of the nerve head, but their course in the remaining portion of the nerve is more or less in doubt.

Most enlargements of Mariotte's blind spot, however, occur from another cause—namely, intraocular changes immediately surrounding the optic disc. This is evident in chorioretinal conditions in which the peripapillary rods and cones are rendered incapable of receiving impressions by the chorioretinal disease. In papilledema, chronic Bright's disease and diabetes, the essential element is the edema which surrounds the disc. In myopia it is caused by a pulling away and atrophy of the retina and choroid. In the progressive stretching of the globe and in commotio retinæ the enlargements are due directly to the damage done to the choroid and retina.

General deductions which may be made from the studies of Mariotte's blind spot are: First, the average normal blind spot is 7° 40′ long by 5° 28′ wide, and is situated 15° 49′ from the fixation center, the upper edge extending about 2° above the horizontal meridian; second, physiologic and anatomic variations noted are (a) the vertical diameter may show shortening, and (b) the blind spot may be at a greater distance than 15° 49′ from the macula; third, the pathologic blind spot first shows a zone of qualitative color loss, second a relative enlargement—i. e., for colors—and finally an absolute enlargement.

Given these facts, a study of the blind spot in pathologic conditions becomes easy and of great value as an aid in diagnosis.

SOME OF THE CONDITIONS IN WHICH THE BLIND SPOT MAY BECOME ENLARGED.

CONGENITAL CONDITIONS.

Of the special conditions in which the enlarged blind spot may be found, the congenital malformations worthy of note are colobomata and opaque nerve fibers. Coloboma of the disc may include only the disc, or it may be so extensive as to include the macula. Figure 1 is the blind spot of an extensive central coloboma, including the macula and disc. In these areas the enlargements as a rule are absolute, both for form and color. Surrounding the absolute zone there may be a narrow ring of indistinct scotoma. It has also been definitely pointed out that even in the absolutely blind area a test object larger than the small disc usually employed for a study of the central field may excite some visual sensation for form—an area of indistinct scotoma for white within the blind area. This argues for the preservation of a few of the rod and cone elements in the colobomatous area.

Opaque nerve fibers rarely produce enlargement of the blind spot for form. The enlargement as a rule is relative for colors, and more frequently shows only a qualitative color loss.

Figure 2 shows a relative enlargement of the blind spot for red and green, blue and white being normal in this area.

Right Eye.

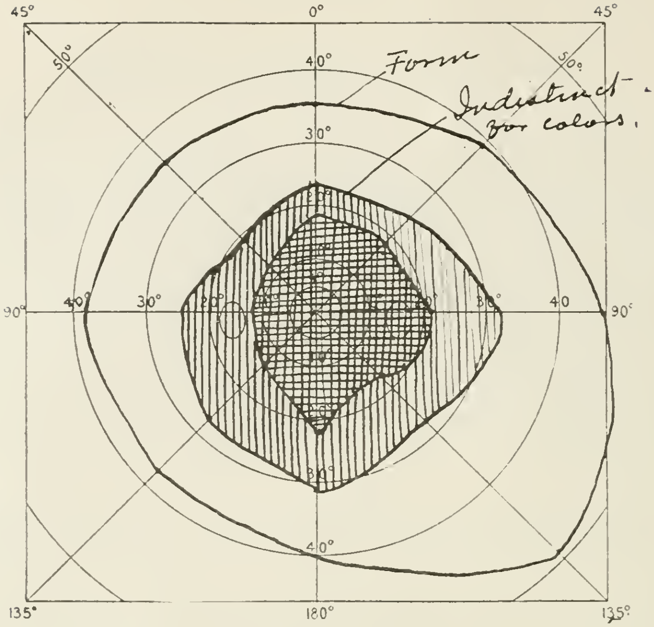


FIGURE 1.

Central coloboma with indistinct color zone.

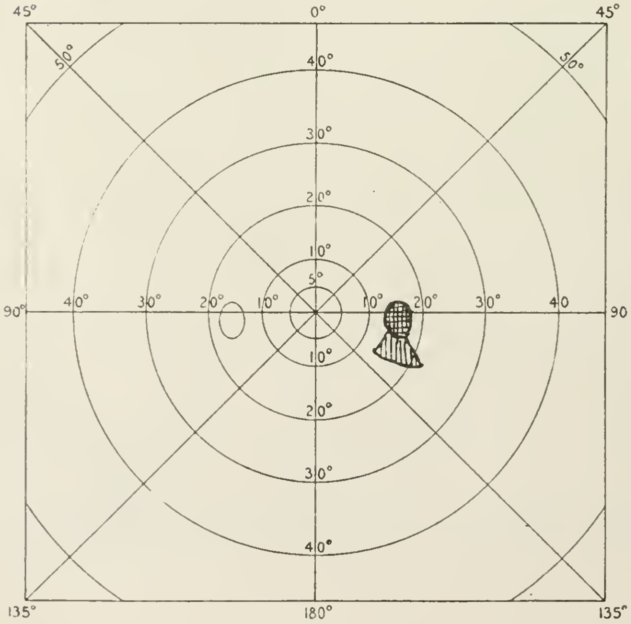


FIGURE 2.

Opaque nerve fibers above disc.

Left Eye.

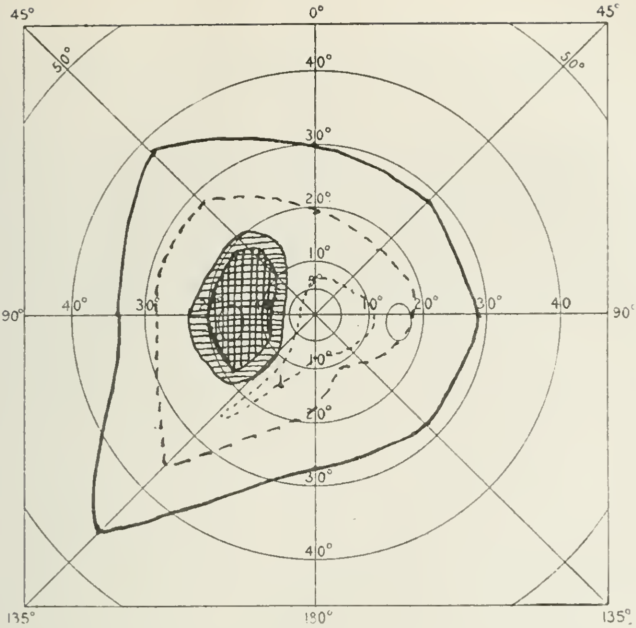


FIGURE 3.

High myopia minus 23 D. after cataract extraction.
Vision, 20/50.

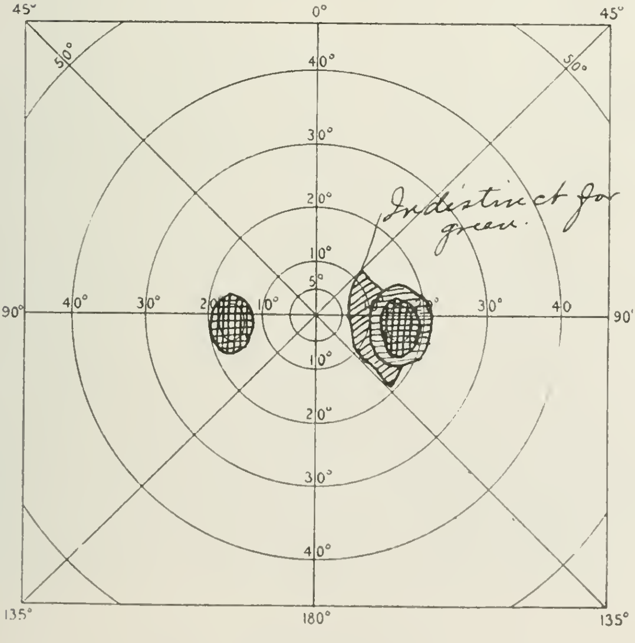


FIGURE 4.

Chronic antrum and posterior ethmoid disease.

MYOPIA.

Studies of the blind spot in myopia are interesting. In low grades of myopia the distance of the blind area from the fixation center is increased. When, however, the anterior posterior diameter of the ball is lengthened by a progressive myopia, the blind spot is much enlarged by the pulling away and atrophy of the tunics of the eye. This is well illustrated in Figure 3. The patient was a high myope of minus 23 diopters, and the blind spot was charted after a successful cataract extraction with corrected vision of 20/50. Ophthalmoscopically the case was one of posterior staphyloma, the retina being thinned out and pulled from the disc for a considerable distance. The chart shows an absolute enlargement with a large relative zone for red and a much enlarged area toward the macula, where green was totally absent. The optic nerve had undergone considerable change, as shown by the contracted form and color fields. This field represents an advanced stage of myopia. The pulling away and thinning out of the retina can be clearly defined on the campimeter as myopia progresses. As this is a pathologic process, the indistinct peripheral zone is usually in evidence.

ACCESSORY SINUS DISEASE.

Enlargement of the blind spot is probably of more value as a diagnostic symptom in accessory sinus disease than in any other condition in which it occurs. Much of the uncertainty which has existed in the minds of those observers who have doubted the value of this symptom has been due to the difficulty in defining the blind spot on an arc perimeter. The campimeter or tangent perimeter is the instrument which lends itself best to a careful study of the central part of the field. The fact, too, that it is not always enlarged in all forms and stages of sinus disease is an additional factor which has contributed to the confusion on the subject. Enlargements have been reported in disease of the sphenoid, ethmoid, antrum, and in a few instances in advanced frontal sinuitis. Posey reported an instance of the latter. In this case the author reports that the rhinologist found other sinuses involved in the inflammation. The essential factors in enlargements of the blind spot in sinuitis is disease of the bones which make up particularly the posterior part of the orbital cavity, infection carried along the blood stream, or secondary vascular disturbance. In the sphenoid and posterior ethmoid cells, disease even of a mild type may, therefore, involve the optic nerve. In the small optic foramen the outer covering of the nerve is continuous with the periosteum of the bone, and both posterior ethmoid and sphenoid cells are in close juxtaposition. Even a simple congestion, therefore, may give rise to pressure on the nerve without extensive bone involvement. The anterior ethmoid and the antrum must, on the other hand, be profoundly affected before the orbital cavity becomes invaded, and nothing short of extensive necrosis of the frontal cells will give rise to optic nerve symptoms, unless infection is carried by the blood stream.

Acute inflammations of the sphenoid and posterior ethmoid are apt to produce optic nerve symptoms quite early in the history of the case. Van der Hoeve has called our attention to the fact that the peripapillary nerve fiber bundle may be involved long before other parts of the nerve show signs of disease. This is particularly well shown, as he claims, in the early enlargement of the blind spot. Occlusion of the ostia of the antrum may, in a similar manner, produce distention in acute inflammation and encroach upon the optic nerve. It is doubtful, however, whether acute frontal sinuitis will ever produce optic nerve involvement. In acute sphenoidal disease the optic nerve is involved so early that disturbances of vision may be one of the first symptoms of which the patient will complain. In fact, vision may be so much reduced that perimetric studies will show only light perception and light projection, and a study of the blind spot cannot be made. If, however, the examination is made sufficiently early, an enlarged blind spot will be found, as in any other form of retrobulbar neuritis, even though ophthalmoscopic changes cannot be observed.

It is, however, in the chronic forms of sinus disease that the symptom is of most diagnostic value. Here the process is slow and insidious, and the diagnosis is not always readily determined. Furthermore, danger of complete optic atrophy may be averted by early operation if the diagnosis is properly made and if there is evidence of this first symptom of optic nerve involvement. Chronic disease of any one of the four

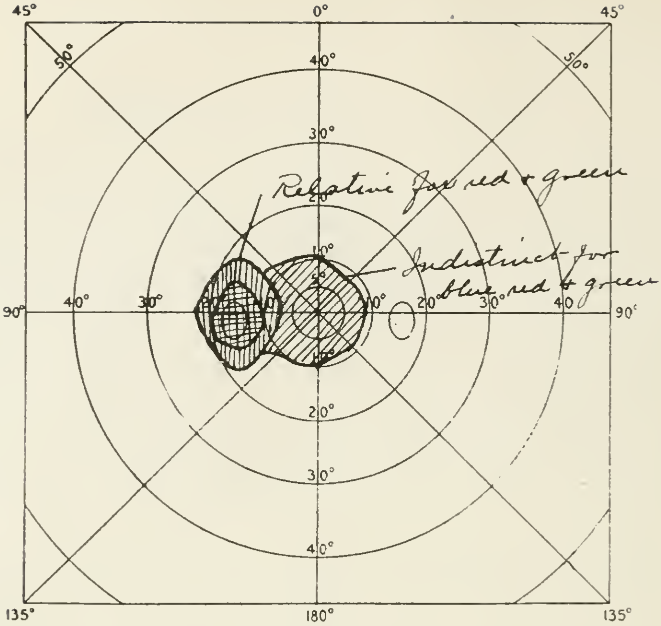


FIGURE 5.

Chronic Bright's disease. Blood pressure, 240 mm. Hg.

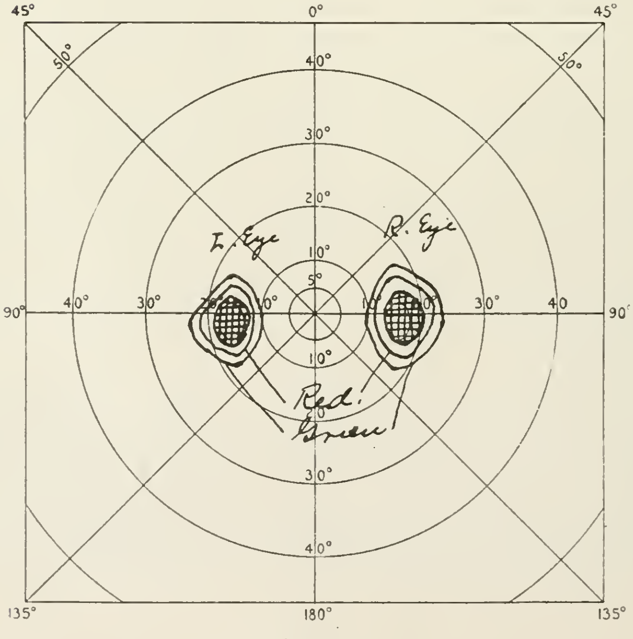


FIGURE 6.

Chronic diabetes. Blood pressure, 195 mm. Hg.

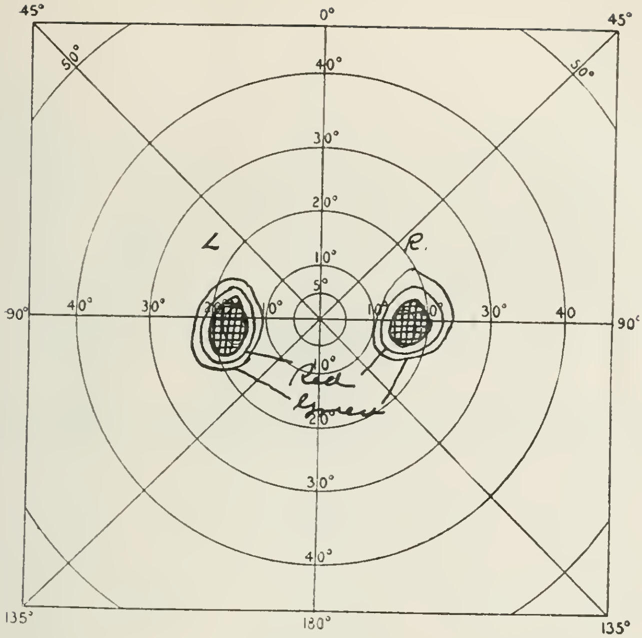


FIGURE 7.

Acute retrobulbar neuritis.

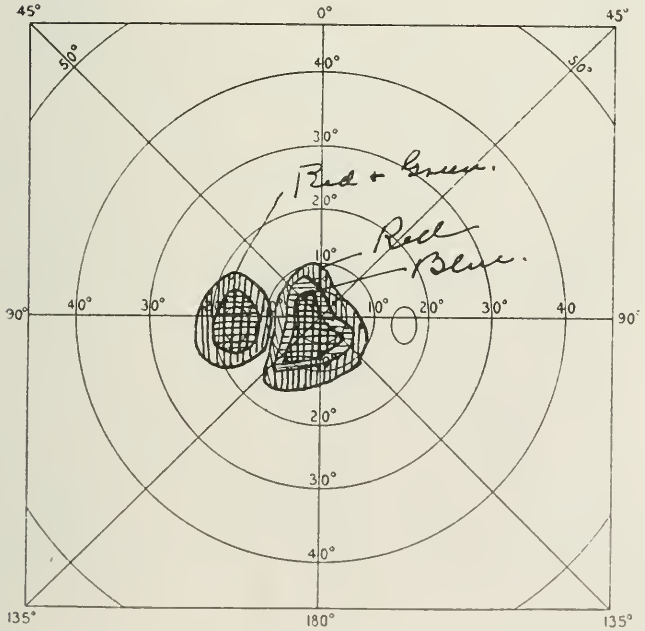
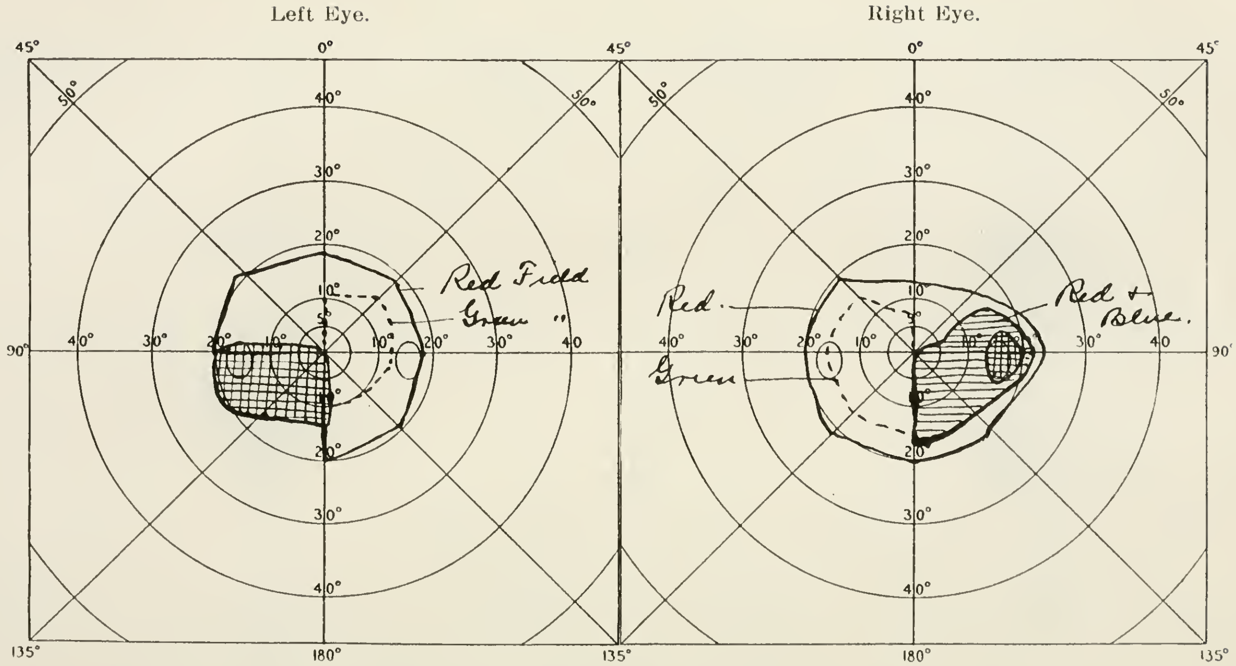


FIGURE 8.

Acute retrobulbar neuritis (luetic).


Left Eye.

Right Eye.

Gumma of chiasm. Eye ground negative.

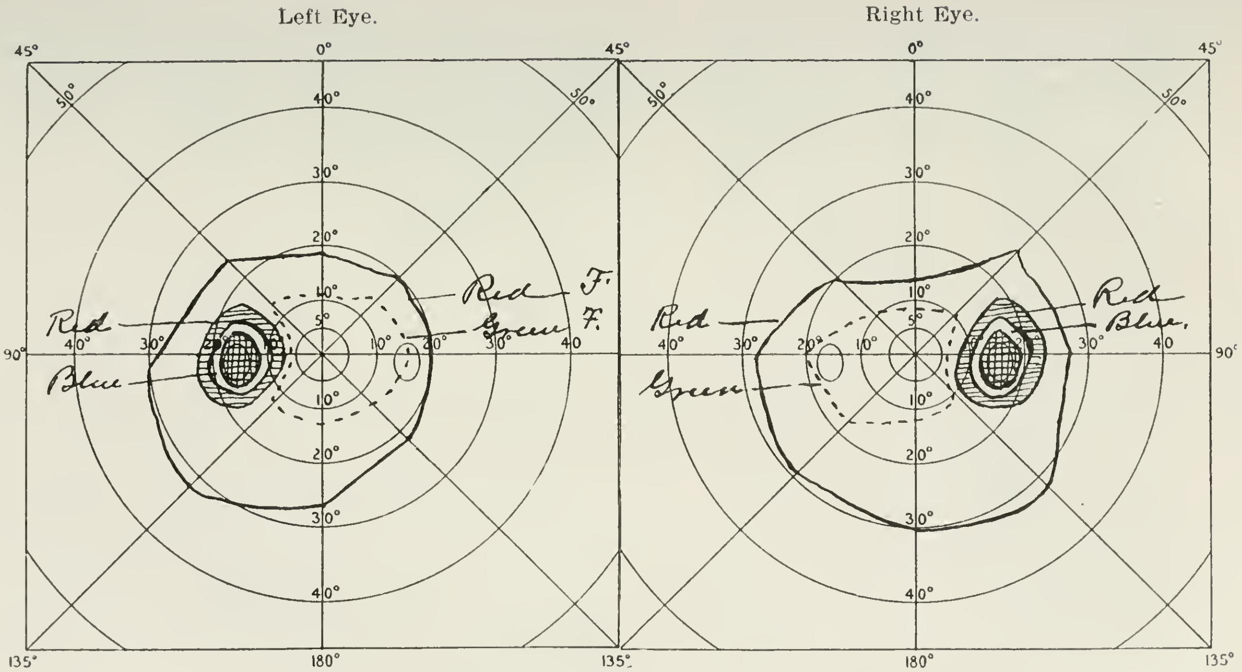


FIGURE 9.

Enlarged blind spots after one week of treatment.

accessory cavities may be the cause of a retrobulbar neuritis. The order in which this is most frequently observed is sphenoid, posterior ethmoid, antrum, anterior ethmoid and frontal sinuitis. In the latter location, however, nothing short of extensive necrosis is apt to be accompanied by optic nerve disease. In disease of the sphenoid and posterior ethmoid, on the other hand, the nerve rarely escapes because of the proximity of these air spaces to the nerve.

A central scotoma may or may not accompany the enlarged blind spot, as in other forms of retrobulbar neuritis. With this and other perimetric findings, however, this paper is not directly concerned.

In view of the frequency of this symptom, therefore, in both acute and chronic sinuitis, it should be needless to urge that careful perimetric studies be made in all suspected or recognized forms of sinuitis, even though ophthalmoscopic findings are negative.

CHRONIC INTERSTITIAL NEPHRITIS.

A clinical picture sufficiently characteristic to be suggestive of arterial hypertension is now recognized. The essential features are venous stasis, retinal edema, and finally a low grade neuroretinitis. Fields become contracted for form and color, and in a majority of instances there is a characteristic enlargement of the normal blind spot. This enlargement is present in fairly early stages of the process and long before the socalled typical "albuminuric retinitis" manifests itself. The same condition, although to a lesser degree, obtains in high blood pressure of chronic diabetes. It is evidence of the neuroretinitis and edema around the disc which accompany these conditions.

In Figure 5 one eye shows an enlargement due solely to optic nerve involvement. The other blind spot is extensively enlarged by massive areas of degeneration of the choroid and retina—the socalled "albuminuric retinitis." Absolute enlargements are not infrequent, even in what have heretofore been regarded as mild forms of retinal disturbance from this source, but color enlargements particularly of the qualitative types, are more frequently recognized. From my studies thus far made in this direction, the possibility of recognizing, or at least suspecting, incipient forms of chronic interstitial nephritis

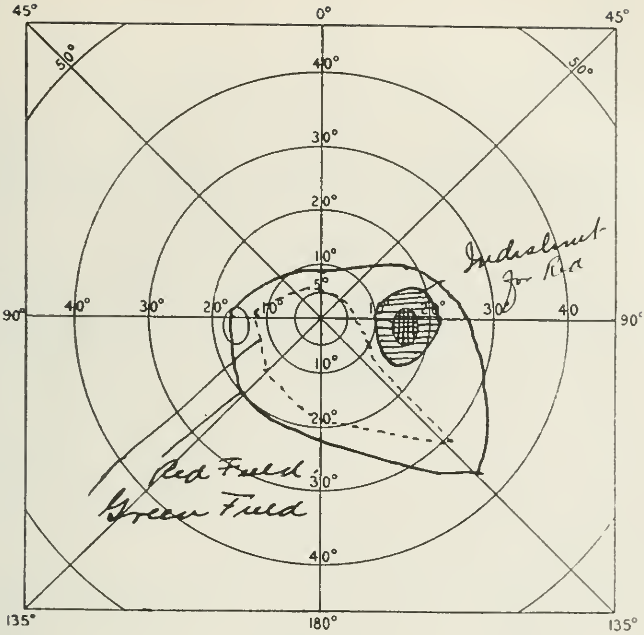


FIGURE 10.

Primary optic atrophy.

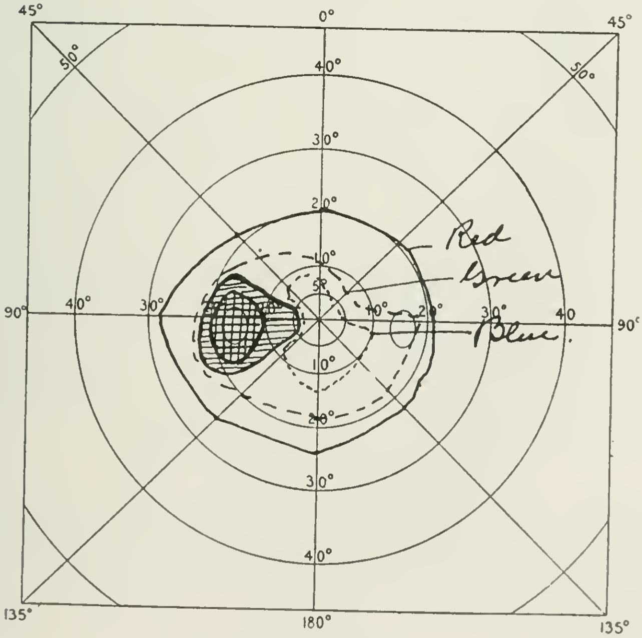


FIGURE 11.

Retinochoroiditis.

from perimetric studies seems as hopeful as the recognition of the prealbuminuric retinitis stage by the use of the ophthalmoscope.

OPTIC NEURITIS AND PAPILLEDEMA.

Probably all forms of optic neuritis are accompanied by enlargements of Mariotte's blind spot. Frank types of optic neuritis visible with the ophthalmoscope need hardly detain us. As a rule, the blind spot suffers more than the peripheral field, particularly when the disc is swollen, as in papilledema. This, as a matter of course, is in the early stage, before regressive changes have taken place, and before atrophy is established. A qualitative color loss usually covers an area in proportion to the degree of swelling, while absolute enlargements occur at a later period when atrophy has begun.

Like the central scotoma, enlargements of the blind spot are of more diagnostic value in forms of true retrobulbar neuritis without observable ophthalmoscopic signs—the toxic amblyopias, especially of the chronic variety. Although a central scotoma as a rule is the recognized diagnostic symptom, a careful study on the campimeter will often show an enlargement of the normal blind spot extending particularly towards the macula, with a bridge of qualitative color loss connecting the central scotoma and the enlarged blind spot. Later in the case these scotomata may unite into one central scotoma. Bjerrum's syndrome, or scotoma in chronic glaucoma, is similar in character, although different etiologically. In the more acute forms, or rather those which come on rapidly, this is especially apt to be found. If the process is not arrested, the two relatively blind areas become absolute and finally coalesce into one central scotoma. If, however, the blind spot remains normal for white, it should not be regarded as conclusive evidence of the absence of disease. The early change is a qualitative color loss followed by a relative loss for one or more colors, and finally an enlargement for white. These examinations require care and precision, but above all, the patient must be instructed as the examination proceeds.

CHOROID AND RETINA.

Enlargements of the blind spot are noted in choroidal and retinal disease limited to those tunics of the eye, or in chorio-

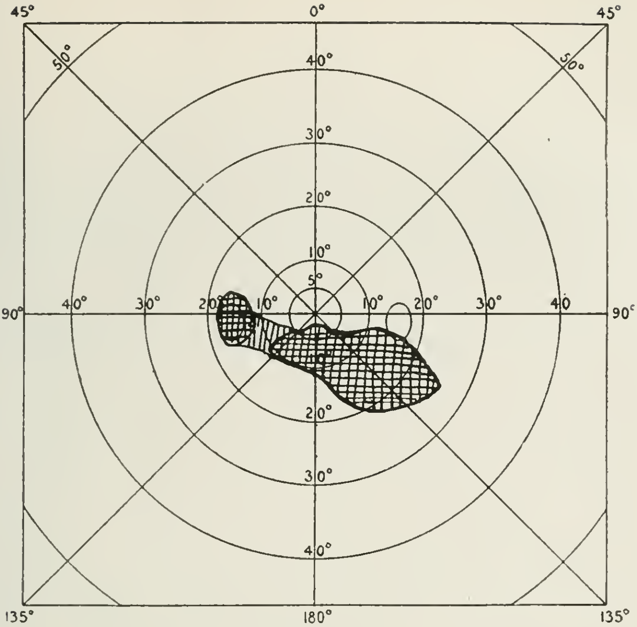


FIGURE 12.

Old central chorioretinitis.

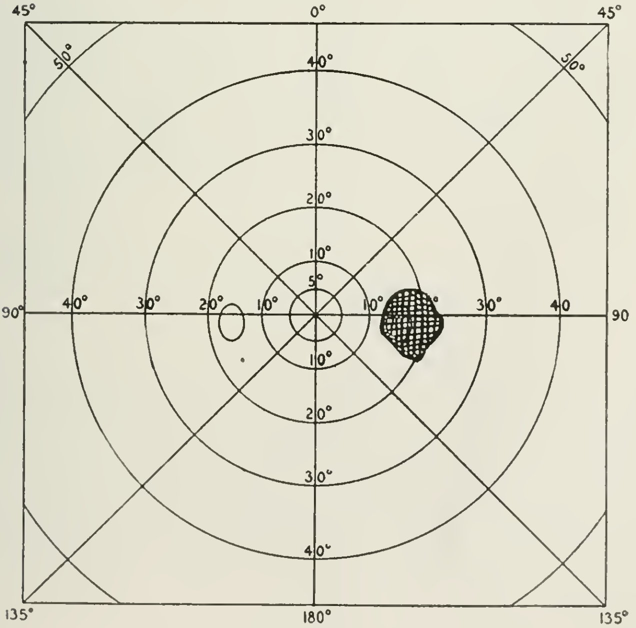
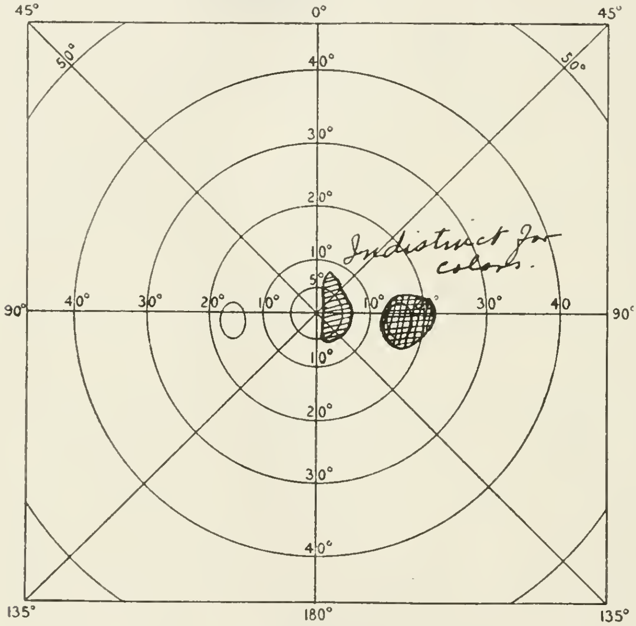


FIGURE 13.

Commotio retinæ.

retinal disease which eventually brings about optic atrophy. In peripapillary chorioretinitis the blind spot may be enlarged in direct proportion to the choroidal and retinal involvement. As a rule, these enlargements are of the indistinct or relative variety, an absolute enlargement being noted only in well established disease such as sometimes occurs in chronic Bright's disease (massive areas of atrophy, hemorrhage, and retinal detachment). There is, however, an interesting difference in color behavior between disease in which the choroidal changes predominate and those in which the retina shows the greatest involvement. In disease of pure nerve elements, as in optic neuritis, and in retinitis, the blind area enlarges progressively for form to blue, then red, and finally green. It is interesting to note, however, that when the choroidal involvement predominates, blue may suffer more, or at least quite as



Indistinct for colors.

FIGURE 14.

Commotio retinæ.

much as the red and green. This is in keeping with the changes which are observed in the peripheral field in chorio-retinal disease. It is of diagnostic value.

COMMOTIO RETINÆ.

Finally, and of no less interest, are the changes which take place in commotio retinæ after injuries to the globe. Lohmann very ingeniously and correctly, in explaining the formation of ring scotoma occasionally observed in commotio retinæ, has pointed out the fact that the firm attachments of the choroid and retina are at the entrance of the optic nerve and the ora serrata. Between these points the tunics are very loosely connected by areolar tissue. In injuries to the globe, therefore, the line of fracture usually extends from the optic disc. It is not unusual to find the blind spot increased in size, particularly in the direction of the rupture of the choroid and retina, or symmetrically around the disc, when no visible evidence of a break can be made out. Figure 13 is an enlargement of this sort, due to a slight break and a hemorrhage on the edge of the disc following a blow on the eyeball. Figure 14 is a similar case due to injuries of a similar character.

What I have said of care and precision in the examination of cases of toxic amblyopia applies with equal force to all examinations of the blind spot and the central field. "Earth has her price for what Earth gives" in perimetry. Patience and accuracy are correlated.

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XVI.

MASSIVE SUBCONJUNCTIVAL INJECTIONS OF CYANID OF MERCURY IN DANGEROUSLY INJURED OR INFECTED EYES.*

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When Lister introduced the carbolic spray into surgical practice, the value of his contribution was not in the detailed technic procedure nor chemical, for both, in time, were superseded by other procedures and chemicals, but in the broad principle of antisepsis, which has come to stay. Likewise, in my humble belief, it is not any particular chemical or dosage in subconjunctival injections that is a matter of importance, but the broad principle that by exciting, by whatever means chosen, a maximum normal physiologic reaction, nature is aided in accomplishing certain feats in resisting disease or injury, which, without this aid, she could not accomplish by such physiologic actions as she could otherwise exercise in a given time under conditions confronting her.

The bulk of what has been written on subconjunctival injections seems to have as a guiding purpose the desire to administer a drug, serum, or what not in such a manner as to avoid reaction; hence the small doses of various mercury salts and saline solutions, as usually practiced.

It seems to me this is trying to avoid the very activities we should seek to encourage. The widespread belief that it is a serious procedure, or a terrible experience for a patient, to have an eye artificially swelled shut, and perchance a somewhat swollen face, is not founded on fact, but likely based on the experience of generations that such appearances, when the result of disease, are of serious omen. In eleven years' use of this method, no instance has yet occurred in which harm can be proved to have resulted, except inasmuch as the conjunctiva is rendered adherent to the globe over a small area surrounding the needle puncture. As practically all cases in which it is used to prevent infection require only one treatment, that is a matter of no concern; and in most cases where it is repeated for treating disease, the gravity of said disease is so serious and the chance of an attached conjunctiva being an impediment to some future operative measure so slight, it need not be considered. Adhesions do not in any way impair the healthfulness of the eye, as cases injected years ago have shown a disposition to improvement, and not decline, where any change at all took place.

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*Read before the American Academy of Ophthalmology and Oto-Laryngology, Chicago, October 5, 1915.

The little that has been written on injections of the mercurials in liberal quantities is calculated to make one approach the subject with fear and trembling. For instance, a recent exhaustive work on injuries of the eye quotes certain authors as having observed adhesions to globe, shrinking or sloughing of conjunctiva, entropium and peculiar changes in the cornea and lens.

As set forth in a paper before the American Medical Association in 1912, the formula which has been mostly used for injection is two cubic centimeters of 1:1,500 cyanid of mercury, in which is dissolved about one-eighth grain each of acoin, morphin sulphate, dionin, boric acid and a little salt, having these latter ingredients already mixed for convenience. The eye should be cocainized very thoroughly for a longer time than usual in operations, and then the injection will cause pain very seldom lasting over fifteen minutes in an eye previously not painful. If conditions already painful, as iritis or iridocyclitis, exist, one-quarter grain of morphin is used. The pain lasts longer, but when it quits it usually takes the previous pain along with it, to stay gone. Dr. Black of Denver informs me he has good results using novocain in his injection fluid as an analgesic. Children are given as large injections as adults. Lieutenant Colonel Smith of India is a strong advocate of massive cyanid injections, and writes that those who visit his clinic are struck by the rapid and marked results obtained in corneal ulcers, lymphatic pannus and keratitis, as well as fundus conditions. He now gives adults one-half grain of morphin hypodermically one hour before, and cocainizes well at the time, to make it tolerable. He writes the younger the child the stronger the dose required to get a standard reaction.

Our present day theories attribute great importance to serums as nature's weapon against infections, and heterogeneous or autogenous serums are injected into the system at large for many conditions. An injection as described manufactures the serum on the spot. Some foreign investigator has used autogenous serum obtained by blistering the patient, and drawing serum under bleb into syringe for subconjunctival injection, and our presiding officer, Dr. Lamb, has had gratifying results from so injecting salvarsanized patient's serum in syphilitic diseases.

The lymph channels are also flushed by the increased lymph flow, and most likely the nutrition of various structures increased by the increase of lymph pabulum supplied. In penetrating wounds of the globe and peripheral ulcers of the cornea, the swollen conjunctiva also covers the wounds, and protects against external contaminations and conjunctival secretions. The swelling usually leaves the center of the cornea exposed, but in some cases that also is covered, where the swelling is more on the globe than in the lids. Where a corneal ulcer is central, an immediate injection is advised to check it at once, and prevent an obstructing scar; whereas peripheral ulcers are treated by simpler established means, until they either heal or demonstrate an inability to do so.

On a certain evening a coal miner came with an extensive hypopyon keratitis, with a small traumatic ulcer as the source of the infection. This man was given a standard injection. Next morning a medical friend was with me, and I said: "I will show you a patient whose eye has been injected, but will not promise to show you the eye." On removing the pad, the lids were not too swollen to open readily, but there was no sign of an eye to be seen, the conjunctiva having closed over everything, so it looked like an implantation had been done. This man was permitted to go home for a week, and on return the eye was clear of all pus and inflammation and sight practically normal. Several similar cases in miners have given the same good, prompt results.

In a symposium on "Industrial Accidents" before the

British Medical Association, after the adoption of national insurance, Mr. Pooley, an eye surgeon of Sheffield, stated that notwithstanding the large number of ironworking establishments, with their varied perforating and other eye injuries, more eyes were lost by virulent hypopyon keratitis in coal miners in the district than by all those in the iron industries combined. Neither did he speak too optimistically of its treatment. In an abstract in the ANNALS OF OPHTHALMOLOGY, p. 564, July, 1914, from *R. Clinica Oculistica di Roma,* Cirincione says, relative to hypopyon keratitis: "Whoever can succeed in protecting the corneal focus from contact with the conjunctival secretion, and can succeed in increasing the intraocular lymphatic circulation and that of the corneal lamellæ, will discover the best remedy for this very grave disease." It seems very much as though his specifications are completely filled by the massive injection as detailed.

Our secretary, Dr. Francis, read a paper at the 1913 session of the American Medical Association on the "Closure of Scleral Wounds by a Double Sliding Conjunctival Flap." This closing is also accomplished by the swelling of conjunctiva after a massive injection; the scleral lips may or may not be approximated, but the wound will be covered. It is my practice to immediately make this injection in all wounds known or suspected to have entered the vitreous or ciliary region, whether accidental or operative. What an eye will stand under these circumstances without developing inflammatory reactions, sepsis or degenerative after-changes surpasses the belief of those who have not witnessed it. In a number of instances where an injection was made within the first few hours following penetration into the vitreous by shot, nails, etc., healing was as uneventful as where the cornea only had been injured by an aseptic instrument. Due to the extreme susceptibility of the vitreous to infection, the injection must be made within a few hours after penetration, or it will be too late to prevent degenerative changes, although the inflammation may still be arrested.

An extreme illustration of the foregoing claim is the case of a boy of seventeen years, who came on the forenoon of May 26, 1914. The evening before, while at work in a coal mine, by some mischance his pick glanced and penetrated the outer third of the left lower lid and the eyeball about one quarter of an inch down and out from cornea, making a jagged hole. The anterior chamber was full of blood, eyeball intensely congested and tender to touch from incipient iridocyclitis. It was explained to him that such eyes were universally removed at once, but that if he wished an effort would be made to save the ball, no hope whatever being entertained as to sight. An injection was made and in an hour or so, after covering the eye with a pad, he returned to his home. He did not suffer any pain after the initial one from the treatment, and in a few days the blood was absorbed, showing iris of normal color, but pupil occluded completely. After all swelling subsided the cornea was of full size and tension normal. A dark spot about two millimeters in size was seen under sclera just behind iris at top, where pick came near emerging, and a puckered scar at wound of entrance. After several months of comfort, he developed an iris bombé, with increased tension and some pain. The iris was punctured by a needle, and another injection made to prevent inflammation closing puncture. Since that time the iris has remained flat, is normal in size and color, tension normal and no pain or tenderness. He has light perception in all directions, and can tell a pocket flashlight readily at twenty feet. It is probable that a sufficient opening in iris and a cataract glass would give useful vision, in case he lost the other eye.

The question of danger of sympathetic inflammation from these retained eyes naturally presents itself. As sympathetic inflammation seldom develops except where there has been a penetrating accidental or operative wound, it is highly probable that it is due to germs introduced into the eye at the time, which remain dormant until certain favorable conditions for their activity arise. If this be so, and the increased physiologic processes excited by injection completes their destruction, then we need not fear this specter; but it remains for the future to see whether or not this is the fact.

After all operations for removing foreign bodies from the vitreous, whether successful or not, an injection should be made to safeguard the eye from infection, both of the original wound or any incident to operation. Several experiences of this kind have been entirely satisfactory.

A serious traumatism involving the vitreous, to which I have applied this treatment in only one case, is the following:

December 5, 1914, Mr. N., aged fifty-one years, came with a history of having been struck three days before in left eye by a stone, causing much pain and greatly reduced vision. The eye was congested, painful, pupil dilated and vision reduced to counting fingers. Examination showed the lens had been completely dislocated and was in the bottom of the vitreous. As extracting such lenses is usually exceedingly dangerous and uncertain, and leaving them in generally results in iridocyclitis or glaucoma, ending in blindness, sometimes calling for enucleation, he was advised to submit to an injection in hopes that it would so tone up the resisting powers of the eye as to enable it to tolerate this abnormal condition. The same was done, and he went home, reporting back on December 12. All reaction had subsided, and with a lens V. = 20/75. On January 23, 1915, V. = 20/30 and Jaeger No. 1. No activity of any kind in evidence; lens lying in bottom of vitreous and swaying with movement of head forward and backward. It has given him no trouble except from glare up to present writing. Examined on September 18, 1915, perfectly opaque lens lying deep in vitreous. Lying face down over edge of table lens drops down over pupil. With strong convex glass and pin hole, vision equals 20/30, and Jaeger No. 1. His other eye is only 20/30 +. He has no redness nor pains and tension is normal.

Of penetrating wounds of the anterior chamber, some going into the lens, by nails, etc., there have been several cases in which no inflammatory symptoms whatever developed. For instance, a young man of eighteen years of age came on February 9, 1915. While loading hay, a broken wire of the size used for baling hay penetrated the outer edge of the cornea at the limbus of the left eye and traversed the entire chamber to a point at opposite limbus, pushing a little of the iris into sclera, where it almost made a counter puncture; some iris prolapsed through wound of entrance. An injection was made, and, aside from putting on a pad and black glasses, he was allowed to go where he pleased. No inflammatory reaction occurred and his vision was perfect.

Of ruptured eyeballs there have been several cases, of which the following is a type:

January 28, 1914, a boy of seventeen years was working in the woods with an axe when a chunk of wood struck his eye, completely rupturing the cornea and well out into the sclera on both sides; the iris protruded through full extent, with no pupil inside. He was given an injection, and returned same day to his home, making an arduous trip considering the circumstances. In one week, nothing having been done in the interval, he returned with wound entirely healed, having had no pain or tenderness. He has had no trouble since, and replies that he has a little sight in the eye.

To show that these eyes do not later degenerate, a case will be quoted from a paper entitled "A Method of Preserving Eyes Which Are Usually Removed," read before the Pennsylvania Medical Society and published in the *Pennsylvania Medical Journal,* January, 1911:

"May 26, 1907. Henry B., aged forty years, had eyeball ruptured by block of wood flying from a saw in lumber mill. Horizontal wound extended across center of cornea and a little into sclerotic on each side; wound filled by prolapsed iris; eye filled with blood; no vision.

"Injection of cyanid solution was given. In a few days blood began to clear up, and it was then seen that the lens had been dislocated and was lying horizontally in pupil. However, wound healed with cornea above and below tear absolutely clear, vision returning. He was told of the complications likely to occur from the dislocated lens, and warned to return if any severe pain developed. Everything went well, with patient back at work for some time, when a violent pain seized him, and on reporting there was found a distinct attack of acute glaucoma. Adopting, as has been done in some other instances, another of Darier's claims that injection of adrenalin is capable of reducing glaucomatous tension in certain cases, a single injection of thirty minims of 1:5,000 adrenal with cyanid was made, which promptly broke up the attack. The lens is adherent by its narrow edge to corneal scar and, not filling the entire pupil, the fundus can be clearly seen. With a strong lens patient has good distant and reading vision. In this case the primary injury certainly called for enucleation according to usual standards, and the secondary complication might have required an effort to remove the lens with all its risks under the circumstances. A recent letter of inquiry elicited the reply that there has been no further trouble."

In a few cases of iritis, where the absence of vision seemed to indicate the possibility of some deep seated complication which could not be diagnosed by reason of inability to see the fundus, the injection has been made as a safeguard against a possible choroiditis, etc. I believe the effect is to lessen the pain, and have sometimes wondered if it might not cut shorter the course of the average iritis, but have not tested it out to a conclusion. The following is an illustration:

On May 1, 1915, a man of thirty years came with a suppurative iritis so violent he had not slept for several days or nights. Although the pupil was fair sized and had no exudate, he could only tell light from dark, and the eye could not be seen into. He was given an injection containing one-quarter grain of morphin, instead of the usual eighth. Being unable to anesthetize an inflamed and painful eye by cocain drops, which were used freely, he suffered atrocious pain for an hour, as do most cases already very painful. But he suffered very little, if any, afterward. It was nearly two weeks before sight returned, during which he was using orthodox local and internal treatment. Sight was finally supernormal, as was the other eye, and nothing left to show why the case had been so unusually severe.

In the graver forms of corneal ulceration, injection is the most potent means of control we possess, either alone or in conjunction with the usual treatment employed, as iodin, carbolic acid, actual cautery, curetting, paracentesis or iridectomy. The clearness of scar tissue is a striking feature, as compared to what is otherwise usual. Instances have been observed where quite efficient vision was restored, where ordinarily leukoma would have altogether precluded this possibility. In those rapidly destructive ulcerations due to suppuration of the tear sac, it is my practice to open the tear sac, destroy it completely by electrocautery, burn the ulcer with the same, and then give an injection, all at one sitting. When done sufficiently early the result is all that could be desired; a day or two of delay will make it too late. In one case of typical rodent ulcer of the cornea, injection in conjunction with antiseptic utterly failed. Three subsequent eyes were curetted, burned with cautery and injected all at same sitting, and healed as promptly and smoothly as the simplest forms of ulcer. They had the ulceration extending well into sclera, which is the characteristic feature for diagnosis. These cases are reported to bring out the advantage of adding injections to routine measures in cases where those measures alone, and injections alone, might both fail. In the ANNALS OF OPHTHALMOLOGY for July, 1915, a case is cited of a cure of an extensive retinal detachment by combined subconjunctival injection and galvanopuncture of sclera.

In conclusion, let me ask some of those who look on the measures advocated jeeringly or with neutral indifference to try it on some of their cases of penetrated, ruptured, or extremely ulcerated eyes, or iridocyclitis of not too long standing, which they would ordinarily enucleate, and if it proves good, use it on eyes which are supposed to have a fighting chance. It is said that the elder Critchett was wont to facetiously remark he could not sleep well at night if he had not removed an eye that day. Had he known of and practiced massive subconjunctival injection up to its capabilities, he would, no doubt, have spent many a restless night.

XVII.

FRACTURE OF DESCEMET'S MEMBRANE.

SYDNEY WALKER, JR., B. S., M. D.,

ASSISTANT SURGEON, ILLINOIS CHARITABLE EYE AND EAR INFIRMARY,

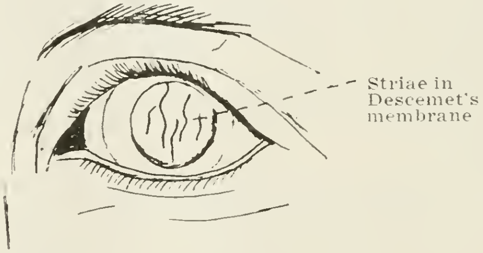
CHICAGO.

There have been many cases of fracture of Descemet's membrane due to birth injuries, myopia, intraocular tumors, and buphthalmus reported; in fact, this condition seems relatively frequent when the literature is looked up. Those due to direct trauma from blunt objects and the like are relatively rare, hence this paper.

Mr. F. S., laborer, aged thirty-two years, entered Dr. Dodd's clinic at the infirmary on October 29th and gave the following history: One week previously, while working, he had fallen into a hole and hit his right eye against a water pipe. Patient stated that he had never had any previous trouble with his eyes, except that he was somewhat near sighted. This injury caused him some pain, which disappeared soon, and he had come to the clinic on account of rapidly failing vision in his right eye.

Examination.—Right eye showed slight puffiness and discoloration about the lids and supraorbital ridge. Patient complained of some pain on pressure, and there was marked ciliary injection. The anterior chamber was quite deep and the cornea slightly hazy in ordinary daylight. With oblique illumination, however, five nearly vertical tortuous striæ, resembling cracks in ice, could be very readily seen on the posterior surface of the cornea. With the ophthalmoscope these striæ were very difficult to make out, but a view of the fundus, which was apparently normal, was obtained. His vision at this time was: Right eye, 5/200; left eye, 20/50 (refractive error). Pupils reacted to light and accommodation. Patient was put upon cold packs, and atropin and dionin instilled. He returned one week later with vision in the right eye reduced to perception of light. The striæ in the cornea were very faint, and there were many fine, dust-like deposits on the cornea. The ophthalmoscope at this time showed many floaters in the vitreous, and the disc was very faintly made out. Ciliary injection had entirely disappeared and the tension was minus two (finger tips).

Patient reported to the clinic ten days later and stated that his vision was not improved. Examination now showed many dust-like deposits over deep corneal surface. Corneal injection gone. Tension, minus two. The vitreous was filled with floaters, and a careful examination for tears in Descemet's membrane failed to show any. Patient was put on potassium iodid and mercury, and reported at the clinic every ten days.



Illustrating Dr. Walker's Case.

After two months, vision was: Right eye, light perception: left eye, 20/30 with correction. The cornea and the vitreous present the same appearance as they did at the third examination, except patient has detachment of retina. Dr. Dodd, who looked at the case with me at first, was unable to find tears in Descemet's membrane at this time either.

In a review of the literature on this subject I found that E. B. Coburn[1] in 1908 claims to report the first case of this type. His case was that of a laborer who was struck in the eye during a fight. The condition was diagnosed as multiple rupture of Descemet's membrane. The lines cleared in four days, leaving no corneal opacity and with normal vision.

McCool[2] in 1910 reported a Y-shaped rupture of Descemet's membrane, due to a piece of machinery. There was blood in the anterior chamber, but there were no other complications, such as tears of iris, sclera, cataract or hemorrhage in the vitreous, as are usually met with in severe ocular injuries.

Wagenmann[5] gives an excellent brief account of some of the different phases of corneal involvement from blows on the eyes. He states that in rare cases the opacities following a blow on the eye take the character of deep linear keratitis. Their appearance is similar to the well known deep striped keratitis following cataract operation, which, according to Hess and Scheimer, is caused by folding of the deep layers of the cornea, especially of Descemet's membrane.

Czermak reported the occurrence of deep stripes at the periphery which can be seen for a long time along with the transient diffuse opacity which is due to an injury of the deep layers of the cornea at its juncture with the sclera. He is uncertain whether it is due to a folding of Descemet's membrane or to a collection of fluid in the lymph spaces of the cornea. They may be red from blood from Schlemm's canal.

Scheimer thinks these stripes are due to folding of Descemet's membrane with edema of the deeper layers. The persistence of the edematous swelling is due to the wounding of the endothelium. Even the striped corneal opacity disappears completely after a shorter or greater length of time. If the striped corneal opacity comes with the diffuse, it lasts a longer time. Also, often permanent deep lines and stripes may be seen, which are due to tears, with rolling of Descemet's membrane. These run almost vertical or a little slanting and remain a long time, some being permanent. They may be accompanied at first by deep diffuse opacities.

What might be classed along with this type of case, but not from the same etiologic factors, was brought out by Stoemer[3] in 1907. He observed fractures of Descemet's membrane from the effects of an explosion of roburite, and attributed many as due to the rarefaction of the air following condensation. As a result the eyes were first pressed in and then brought forward by the suction of the rarefaction, the cases resulting in cataract, intraocular hemorrhage and tears in Descemet's membrane with subsequent deep corneal opacities. While not due to direct trauma, the explanation of the etiologic factor was quite interesting.

Müller[4] in 1895, in a paper on injuries to the eye with blunt force, concludes that rupture of the globe involves the sclera and cornea as five is to two. In youth the cornea tends to rupture from blows with blunt instruments, while in old age it is usually the sclera, and that direct and indirect ruptures are equally frequent. There is no relation between the direction of the corneal rupture and the direction of which the blunt instrument approaches the eye.

In the case I have reported the rupture was in all probability due to sudden stretching of the cornea from without inwards, just the opposite to those due to myopia, buphthalmus, etc. And according to Müller, the force could have come from any angle.

CONCLUSIONS.

Fracture of Descemet's membrane from blunt force is relatively rare.

It is usually complicated by intraocular hemorrhage, cataracts, etc.

It is more likely to happen in youth than in old age.

It usually leaves permanent scars, but they may at times disappear soon.

I am grateful to Dr. Dodd for his courtesy and assistance.

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2. McCool: Ophthalmology, 1910.
3. Stoemer: Klin. Mon. f. Augenheilk., 1907.
4. Müller: Ueber Ruptur der Cornea, Sclera, Kapsel, etc., Vienna, 1895.
5. Wagenmann: Graefe-Saemisch Handbuch, Vol. IX, pt. 5, p. 412.

XVIII.

EYE RECORDS DESIGNED ESPECIALLY FOR OFFICE USE.

Frank R. Spencer, A. B., M. D.,

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The author realizes fully the imperfections and incompleteness of the accompanying history sheet, as any record, no matter how complete, will not be suitable for all cases. However, this one will serve as an outline, and case notes may be written on any of the unused lines or on the margin. Some ophthalmologists object to any printed form and prefer instead a blank card. Errors and omissions are less likely to occur, however, with a printed record.

The records which the author formerly used were a little less than half this size and were modified, in minor details, from those which Dr. George F. Keiper, of Lafayette, Indiana, uses. It has been changed greatly, as well as being enlarged, to meet the requirements of our advancing science.

A detailed explanation of this record would be superfluous, but a brief explanation may not be out of place.

M., S. and W. refers to married, single, widow or widower. P. or G. is the name of the parent or guardian. It is usually sufficient to write the father's initials here. Page one is devoted almost entirely to the history.

Page two is for recording the vision—first without lenses, and second with lenses, in case the patient is wearing glasses. Much of this page is devoted to recording the results of the examination of the anterior segment of each eye. Near the bottom the test for refraction may be recorded. While strictly speaking euphthalmin should not be classed with the cycloplegics, it is more convenient to place it here, as most ophthalmologists use it in presbyopes for fundus examinations. The author always makes at least a second keratometer reading, as a control test, hence the two lines for this.

Inasmuch as a few presbyopes require a pair of lenses for their music, in addition to those for distance and reading, two lines have been devoted to this. The range of accommodation should be tested for each eye separately. The author is indebted to Dr. George F. Libby, of Denver, former associate of Dr. Edward Jackson, for this suggestion.

It is convenient to place the number of the carbon copy of any prescription given a patient after the large ℞ No., and the number of the carbon copy for glasses after the small ℞ No. on page four. If carbon copies of all prescriptions are kept in a book for this purpose, they can be easily referred to from time to time.

The diagrams make it easy to keep drawings of pathologic changes.

The double sheet, of four pages, measures 11x9 1/10 inches in size, and has a half inch margin all around with three-tenths of an inch space between the lines. It fits readily into any standard letter filing cabinet. The type used in printing are number eight point.

Many changes in this entire record suggest themselves to meet individual requirements, but should any of the readers of this article prefer this record, they may obtain them from the Boulder Morning News Publishing Company for $8.50 per thousand. If very many are ordered they can be purchased for less. The first thousand were the most expensive, and cost sixteen dollars and fifty cents. The printers have kept the forms, so they are prepared to print these for much less than the first thousand cost.

Name.......... Date..........
Address.......... Age.......... M. S. W..........
Former residence.......... Occupation ....
Referred by.......... P. or G..........
Chief complaint..........
....
Date..........
Mode of onset..........
Previous ocular disease..........
Refracted..........
By whom..........
General health..........
Nervous system..........
Family history..........
Pain.......... Location..........
Character.......... Duration..........
In A. M.......... In P. M.......... After reading..........
Smarting.......... Itching.......... Burning.......... Twitching..........
Lachrymation.......... Epiphora..........
V. failing.......... V. improving..........
Failed gradually.......... Suddenly..........
Color sense.......... Photophobia..........
Redness of eyes.......... Lids..........
Halo about lights..........
Discharge in A. M..........
Fields of V. taken.......... Date..........
Date.......... Date..........
....

Distant V. { O. D. .... Near V. { O. D. ....
{ O. S. .... { O. S. ....

Distant V. { O. D. .... Near V. { O. D. ....
W. present lenses { O. S. .... W. present lenses { O. S. ....

Eyelids O. D. .... O. S. ....

Cilia O. D. .... O. S. ....

Lachrymal Apparatus O. D. .... O. S. ....

Conjunctiva { Ocular O. D. .... O. S. ....
{ Palp. O. D. .... O. S. ....

Cornea { Brilliancy O. D. .... O. S. ....
{ Smoothness O. D. .... O. S. ....
{ Cicatrices O. D. .... O. S. ....

Iris { Color O. D. .... O. S. ....
{ Size of pupil O. D. .... O. S. ....
{ Reaction to light O. D. .... O. S. ....
{ Reaction to accom. O. D. .... O. S. ....

Ant. Chamber O. D. .... O. S. ....

Tension { By fingers O. D. .... O. S. ....
{ By tonometer O. D. .... O. S. .... Date ....
{ By tonometer O. D. .... O. S. .... Date ....

Refraction:—Atrop., Hyoscy., Homatrop. or Euphthal. ....

Keratometry { O. D. .... O. S. ....
{ O. D. .... O. S. ....

Cycloplegic { O. D. ....
Refraction { O. S. ....

Presbyopic { O. D. ....
Dist. Refrac. { O. S. ....

Presbyopic { O. D..
Near Lenses { O. S..

Music { O. D..
Lenses { O. S..

Skiascopy { O. D..
Plan. or Con. M. { O. S..

Range of Accom. O. D..............................O. S..............................

Ophthalmoscopy:—Direct, Indirect or Focal Illumination..............................

Media { Cornea O. D..............................O. S..............................
Media { Lens O. D..............................O. S..............................
Media { Vitreous O. D..............................O. S..............................

Disc { Shape O. D..............................O. S..............................
Disc { Size O. D..............................O. S..............................
Disc { Edges O. D..............................O. S..............................
Disc { Color O. D..............................O. S..............................
Disc { Vessels O. D..............................O. S..............................
Disc { Cupping O. D..............................O. S..............................

Macula O. D..............................O. S..............................

Perimacula O. D..............................O. S..............................

Periphery O. D..............................O. S..............................

Strabismus O. D..............................O. S..............................

Heterophoria:—..

Stevens' Phorometer { Es............R. H............ Maddox Rod { Es....................R. H....................
Stevens' Phorometer { Ex............L. H............ Maddox Rod { Ex....................L. H....................

In Near V.:—Es..................Ex..................Cyclo..............R. H..............L. H..............

Adduction O. D..................O. S..................Abduction O. D..................O. S..................

Superduct. O. D..................O. S..................Subduction O. D..................O. S..................

Diagnosis O. D. ....

Diagnosis O. S. ....

Remarks:— ....

Prognosis:— ....

Treatment O. D. ....

Treatment O. S. ....

℞ No. ....

Blood Pressure:—Syst. .... Diast. .... Date ....

Urine:—Alb. .... Sugar .... Casts .... S. G. ....

Bacteria:— ....

Path. Specimen:— ....

Referred to ....

Operation:— ....

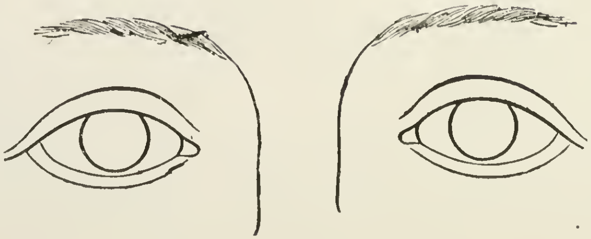
Anæsthetic:— .... Date ....

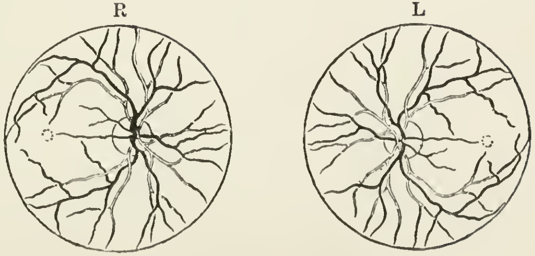
Glasses ordered .... Sent to .... ℞ No. ....

....

....

....





XIX.

HOLE IN THE DISC.

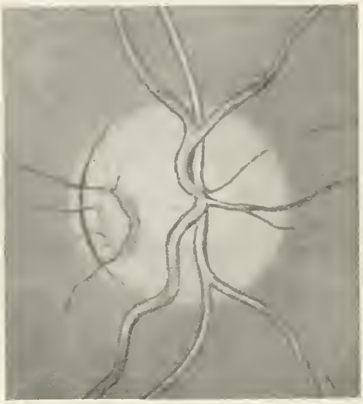
J. Herbert Claiborne, M. D.,

New York City.

In the Annals of Ophthalmology, October, 1913, Carl Williams of Philadelphia published a case of "Hole in the Disc." I had never seen this condition, but singularly enough wthin a week after the publication of his article I saw a case of "Hole in the Disc" in my office. It occurred in a young girl, age eighteen years, who suffered from a slight asthenopia. She had hair of light auburn tint and the fair skin which usually accompanies this type. Her refractive error was trifling and she recovered under treatment within a few days. On her right optic disc on the temporal side there was a hole which looked as if it had been punched out, but on measuring it carefully I found that the bottom slightly shelved toward the temple. There was a blood vessel which crossed the bottom from above and some smaller ones which plunged sharply into it on the temporal side, after the manner of blood vessels in glaucomatous excavation. The hole was oblong in character and the bottom was slightly mottled. The depth on an average was 3 D.

The accompanying cut, made by Dr. Braun of New York, shows the condition with considerable accuracy, but does not present, as Carl Williams says, the startlingly striking character of the defect. It has been observed that the vessels are usually on the nasal side of the optic disc, and it is true in this case likewise.

A number of explanations have been offered for this condition, of which Carl Williams says not less than twenty-five have been reported. Some have considered it as derived from the fetal cleft; another as a disturbance in the lamina cribrosa. Two observers deem it allied to coloboma of the optic disc, and several, "the evagination of a portion of the second optic vesicle into the nerve, or more probably an abnormal differentiation of a part of the neural division of the vesicle into pigmental epithelium and retinal elements." The presence of pigment in the hole has been explained as being derived from the pigment of the retinal epithelium. I was not able in my case to assure myself that this stippled appearance at the bottom, which is shown in the picture, was due to pigment. I am rather inclined to explain it the way we do the stippled appearance in the center of the disc, namely, as apertures in the lamina cribrosa. For my part, I believe the explanation presented by Remak and Szili, that the defect is allied to coloboma of the optic disc, is correct. I should describe it as partial coloboma of the optic disc, and I have so presented the case before the Ophthalmological Section of the New York Academy of Medicine.



ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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"Concussion Rupture" in Warfare—A Warning.

ZORAB, ARTHUR (*Ophthalmoscope*, December, 1915), warns against the diagnosis of "concussion rupture" in cases where the inner lining membrane of the eyes has been ruptured by the near passage of a bullet, usually through some part of the orbit, without any apparent damage of the sclerotic. Two cases are cited.

Case 1.—A bullet wound through the external canthus on the right side, without external injury to the globe, was followed by immediate loss of vision. Vitreous hemorrhage obscured the fundus, and "concussion rupture" was diagnosed. Three months later sympathetic ophthalmitis developed with subsequent loss of sight in the uninjured eye. Examination of the excised eye revealed a healed puncture (probably from a spicule of bone) close to the optic nerve, toward the external aspect. There was a tiny bead of pus adherent to the internal aspect of the puncture in the eye.

Case 2.—Bullet wound through hard palate, passing close to the right eye. Sight was temporarily lost but recovered to 6/24 in three months. Three shining pieces of metal could be seen in vitreous, and a large healed scar in the lower part of the sclerotic. The presence of the metal was confirmed by X-rays, but there was no response to the magnet. It was decided to leave matters alone unless the eye became irritated.

W. R. P.

Eye Lesions as a Point of Importance in Directing Suspicion to Possible Trypanosome Infection.

Daniels, C. W. (*Ophthalmoscope,* December, 1915), writes of the importance of eye lesions as one of the diagnostic signs of trypanosome infection. The eye lesions vary and are not alone diagnostic, but in some cases are the first to cause the patient to seek medical opinion. The eye lesions are essentially a toxic iridocyclitis with a varying amount of keratitis, circumcorneal congestion, conjunctivitis and photophobia of varying degree.

Thirty-two cases are tabulated according to the part of Africa where the disease was acquired. Eye lesions were present in six Rhodensian cases, 83.3 per cent; in ten Nigerian cases, 40 per cent, and in cases from other parts of tropical Africa, 18.7 per cent. Eye lesions were present in 37.5 per cent of all cases.

W. R. P.

On the Papilledema in Gunshot Injuries of the Vault of the Skull.

Jessop, Walter H. (*Ophthalmoscope,* December, 1915), calls attention to the large proportion of patients with gunshot injuries of the vault of the skull who show signs of papilledema. In most of his cases the swelling of the optic disc was slight, generally about 1 D., and seldom more than 2 D. or at most 3 D. Other ocular signs or symptoms were rarely present. Both discs were usually affected, sometimes one more than the other. The changes were chiefly on and in the close neighborhood of the disc, and acute in their onset. The papilla was pinkish in color, the edges of the disc were indistinct and blurred and the vessels were raised close to the edges.

In many cases there is a distinct narrow yellowish white ring around the disc, having a blurred outline and evidently caused by edematous effusion. There may be a striation of the retina near the disc. If there is a marked physiologic cup, it may be partly or wholly filled up. The vision in most cases is not affected. The color sense and the fields of vision are normal.

On relief of intracranial pressure the ophthalmoscopic signs subsided in five or six days, and no signs of any optic atrophy followed.

Papilledema was found in seventy-two per cent of the writer's forty-seven cases.

A case of rifle bullet wound of the left frontal region showing no signs of intracranial pressure except papilledema of right eye, 2 D., and left eye, 1 D., is described. Both fundi showed an edematous ring round the discs. Operation revealed depressed splintered bone with evacuation of half an ounce of pus from an intradural abscess. Patient recovered with vision of 6/6. It is advisable to watch the papilledema carefuly in every case. W. R. P.

A Fallacy in the Diagnosis of Glioma Retinæ.

STEPHENSON, SYDNEY (*Ophthalmoscope,* January, 1916), reports two cases of retinitis exudativa, or retinitis hemorrhagica externa, a condition differentiated several years ago by George Coats. Attention is called to the possibility of confusion with glioma.

The first case was in a boy of two and one-half years, with a history of recurrent inflammation of the left eye, which at times was observed to show the shining appearance of a cat's eye. Examination showed the left eye blind, tension slightly raised, and slight ciliary redness. No pupillary reaction. Areas of clear fundus could be seen here and there, interspersed with grayish white masses of flocculent material. Several groups of strikingly bright spots and patches (difficult to locate exactly) could be seen in various parts of the fundus. A hemorrhage was present in the lower outer part of the vitreous.

The right eye, it should be added, was normal in all respects.

It was thought that the condition might possibly be one of glioma endophytum, and the eye was removed.

Pathologic examination showed a typical nodule lying in the depths of the retina, composed in the main of newly formed fibrous tissue, colored red by von Giessen's stain, and permeated by an extensive system of cholesterin clefts. It contained numerous pigment particles, and enclosed one or more cavities of irregular shape, which often intercommunicated and were frequently more or less filled with the remains of disintegrating blood in the shape of débris, degenerate blood corpuscles, particles of pigment, network of fibrin, swollen leucocytes, and giant cells. Neither calcareous nor osseous changes were found. In many of the sections the choroid could be traced unaltered over the nodules, but in some the two structures appeared to be in organic connection.

For the rest, the angle of the anterior chamber was closed. The tissue of the iris was atrophic, with pigment clumps here and there, and had evidently been inflamed. The subcapsular epithelium extended around the lens.

The second case was a girl of four years, whose left eye had become blind. The tension was plus one, and a complete detachment of the retina was observed. Because of the possibility of glioma, the eye was excised. Pathologic examination revealed complete retinal detachment, the subretinal space filled with a homogeneous coagulum containing "ghost cells," which also infiltrated the retina in places. Two kinds of nodules were found in the outer layers of the retina, both evidently formed from extravasation of blood. The first was a more or less homogeneous collection of fibrin or newly formed connective tissue, while the second occurred as collections of pigmented tissue cells intermingled with new fibrous tissue and remains of blood corpuscles. These included numerous cholesterin cracks or clefts. For the most part the choroid was quite distinct from the retinal nodules, but in one small mass of reniform shape the two appeared to be in structural continuity through imperfections in the pigment epithelium. Many of the retinal vessels were thrombosed, and hyalin changes, leading to narrowing or displacement of the lumen, were not uncommon. The choroid showed no particular lesions. As regards the anterior half of the eyeball, the ciliary body and the iris were atrophic, and the uveal pigment could be seen to extend around the edge of the iris (ectropion uveæ). The posterior pole of the lens was somewhat "moulded." The angle of the anterior chamber was closed. W. R. P.

Congenital Word and Letter Blindness.

WHIPHAM, T. R. (*Ophthalmoscope,* January, 1916), reports a case of alexia congenita, which presents several points of interest. The patient, a child of eight years, with practically negative family history, and in good health, after two years at school is only in the class above the infants because of defective mental powers. While her general intelligence and memory appear good at first sight, she reveals curious deficiencies upon closer examination. She cannot say the alphabet, but can write it perfectly on rare occasions; usually, however, goes wrong after E or F. She cannot write a given letter except occasionally. She cannot spell words of even two letters, and cannot read easy words, and her writing appears to consist merely of a limited number of idiograms. She is able, however, to copy mechanically anything that is written for her, even unknown letters like Greek. She has no word deafness, verbal amnesia or motor aphasia. The Wassermann test is positive. The pathology in these cases is obscure. The outlook is not altogether hopeless, as considerable improvement may be obtained with systematic and sympathetic training.

W. R. P.

A Clinical Study of Fifty-five Cases of Intraocular Retention of Foreign Bodies, With Results Two Years Afterwards (Continued).

BROWNLIE, W. BARRIE (*Ophthalmoscope,* January, 1916). The prognosis is guarded in all cases of penetrating injury to the eyeball with retention of foreign body. A penetrating wound without retention of foreign body gives a much more favorable prognosis, as shown by the writer's thirty cases from the Glasgow Eye Infirmary.

The prognosis in the cases with intraocular foreign bodies depends upon the following points:

(a) The first examination of the eye, the history, the X-ray plate, and the removal of the metal by the magnet.

(b) After an interval of two or three weeks, as a rule, except in a case where there is necessity for urgent removal of the eyeball, there comes the question of prognosis as regards any probability of sympathetic ophthalmitis developing.

The first heading included:

1. The condition of the eye when first seen. Hopelessly damaged eyes should be removed at once.

2. The time elapsed since the injury is important, as an eye with signs of iridocyclitis or hypopyon is of course less favorable. The foreign body is more difficult to remove, and its removal causes more injury to the structures of the eye. The longer a foreign body remains in the eye the less hopeful is the prognosis, especially where inflammation has been set up by its presence.

3. The size and character of the metal is important. Pieces of metal are classified as "chunks," "scales" and "spicules." The latter, as a rule, are easiest to remove. The shape of the metal influences its extraction by the magnet more than the proportion in weight. Scales and chunks are apt to inflict considerable damage on the eyeball.

4. Position of the wound and of the metal in the eyeball. Undoubtedly the cases where there is a wound in the cornea and the metal has come to rest in the anterior chamber, iris or lens are the most hopeful cases as regards both the saving of the eye and the retention of useful vision. In ten of the author's fifty-five cases the foreign body was lodged in the anterior chamber, iris or lens, and useful vision was retained in every case.

Wounds in the ciliary region have long been recognized as serious. Of ten cases, eight eyes were lost and two were saved, one with a vision of 6/18, and the other reduced to counting fingers. The statement is made that ciliary wounds with prolapsed iris, etc., with no foreign body present, provided asepsis is carefully observed, even though the lens is injured, and the wound carefully covered by conjunctiva after excision of all prolapsed iris, etc., are not so much more serious than corneal wounds. It is the presence of a foreign body in the vitreous which makes the injury so much more grave. Cases where the wound is corneal and the foreign body has passed into the vitreous or into the orbit beyond, frequently including the lens in its path of entrance, and setting up traumatic cataract, are considered quite as serious as those where the wound is in the ciliary region. Of eighteen cases of this sort, eleven were "saved," three had visual acuity of 6/9 to 6/36, three had visual acuity of 2/60 to 6/60 after the lens was extracted, and five had visual acuity of perception of light to counting fingers. Seven eyes were lost from plastic iridocyclitis.

Scleral wounds are also considered serious. Of seventeen cases, six eyes were "saved," three had visual acuity of 6/9 to 6/24, and three had visual acuity of perception of light to hand movements. Eleven eyes were lost.

The most dangerous period for the development of sympathetic ophthalmia appears to be between the sixth and twelfth week after the injury. The writer's two cases developed sympathetic ophthalmia one month and seven months after injury, respectively. In both, the injured eye was removed one month after injury. The points laid down by Swanzy regarding sympathetic ophthalmitis are briefly reviewed, from which he concluded that the patient cannot be regarded as safe from the probability of sympathetic conditions developing until at least a year after enucleation of the exciting eye. (To be continued.) W. R. P.

Some Aspects of Ophthalmology in Palestine.

Butler, T. Harrison (*Ophthalmoscope,* February and March, 1916), writes at length of his experience during the four years he served as assistant surgeon to the British Ophthalmic Hospital in Jerusalem. He confines himself mainly to the question of acute ophthalmia, dealing only in a general way with the remainder of the eye conditions.

The chief distinguishing feature of the work in Palestine is the large number and importance of affections of the lids, conjunctiva and cornea. Uveal disease is rare. In 21,600 cases analyzed by the writer, only thirteen cases of iridocyclitis were discovered. This is probably due to the fact that gonorrhea and syphilis are so uncommon in Palestine. Primary optic atrophy is also very rare, probably for the same reason. Glaucoma and cataract are not more common in Palestine than in Europe. The results from cataract operations are as good as those obtained in Europe, showing that trachoma has no influence in increasing the risk of infection. Of sixty-four extractions for senile cataract, fifty-one were normal, eleven lost vitreous, one developed panophthalmitis and one sympathetic ophthalmitis. Not a single case developed postoperative iridocyclitis. Bacteriologic examination of over two hundred eyes showed during the winter endemic period the majority of ophthalmias to be caused by the Morax-Axenfeld bacillus, though the pneumococcus and Koch-Weeks bacillus were almost as common; while during the summer epidemic period the Koch-Weeks bacillus was the chief cause, and the pneumococcus also active. Of the ulcer cases the gonococcus was the most active agent, and mixed infection next in importance.

The epidemic of ophthalmia commences annually in July. The proportion of cases increases rapidly until August, when, as regards numbers, the epidemic is at its height. In November and December the cases are fewer in number, but they are of a far graver type. A large proportion now become complicated by corneal ulcers, which frequently perforate.

While there is a partial, but by no means absolute, correspondence between the ophthalmia and the mean temperature curves, at present no reason whatever can be given for the large amount of ophthalmia in Palestine. The crowded unsanitary conditions of living are largely responsible for the easy spread of the disease.

The symptoms of acute ophthalmia vary somewhat, according to the nature of the organism. The onset is rapid, beginning usually in one eye as a catarrhal conjunctivitis or with a mucopurulent discharge. In the Koch-Weeks infection mild examples may have subconjunctival ecchymoses, while pneumococcal infections have a strong tendency to chemosis. Photophobia is generally slight, but may be severe. The severer cases show great chemosis and thick purulent discharge. The corneal margin may be vascularized for from one millimeter to two millimeters from the periphery, and the pericorneal tissue is turgid. Under treatment ophthalmia lasts from a few days to a month or more, but untreated cases become very chronic, lasting months.

The prognosis is generally good in the Koch-Weeks affection when early treatment is undertaken. The same is true in a slightly less degree of the pneumococcal affection, but there is much greater danger to the cornea.

Infections with the diplobacillus of Morax-Axenfeld are rarely severe and seldom attack the cornea. They are liable to become chronic, but, as a rule, yield to solutions of zinc sulphat or chlorid, if these be employed in sufficient strength.

A mixed infection containing the diplobacillus is generally very chronic and resists treatment. The prognosis in a gonococcal case is always bad.

Taking the cases as a whole, the statistics of five years' cases at the British Ophthalmic Hospital, gathered from 5,700 cases, show that twenty-two per cent of the cases of ophthalmia which came to the hospital already had or acquired corneal lesions, and forty per cent of all these ulcers perforated. Of these perforated ulcers at least half were caused by the gonococcus, either alone or in mixed infection.

The cornea is affected in about one-fifth of all cases. The commonest type of ulcer is a large central ulcer, and the crescentic marginal ulcer is also frequent. Other types are also commonly found.

The sequelæ consists of leucomata; simple and adherent cicatrices, which often stretch and form enormous staphylomata; atrophy of the globe, nebulæ and facets.

Protargol in thirty-three per cent solution has been found to be the most efficient in the treatment. Where the diplobacillus of Morax-Axenfeld is present, zinc is used after the firts few days. Ulcers are cauterized if tending to spread.

Trachoma is seen in Palestine in its severest forms and is almost universal.

Spring catarrh is fairly common and often very severe. Pterygium also is very common in Palestine. W. R. P.

Acidosis and Edema in Its Relation to Glaucoma.

SMITH, LT. COL. HENRY (*Ophthalmoscope*, February, 1916). With the view of determining the effect of acidosis in causing an edema of the vitreous with resultant glaucoma, the writer examined specimens of urine from six hundred British soldiers and six hundred Indian soldiers in India. The average acidity in the case of the Indian troops was slightly higher than that of the British. But there was such a wide range in the acidity in health, that an average determined thereon is worthless. The urine of many glaucoma patients also examined showed an acidity well within the limits of health.

The writer is inclined to attach importance to Dr. Martin H. Fisher's theory that glaucoma is caused by an edema of the vitreous dependent upon an acidosis. He believes that, while acidosis may not be the cause, glaucoma may be due to an autogenous toxin which has a special selective affinity for the vitreous, causing an edema of that body. This edema presses forward the lens, zonula and iris, and presses on the ciliary body, thereby bringing into action the mechanical factors on which so much stress has hitherto been laid as the cause of glaucoma. W. R. P.

On the Use of Methylen Blue in Eye Work.

ADAMS, P. H. (*Ophthalmoscope*, February, 1916), has employed methylen blue in a large number of cases caused by various microorganisms. A strength of one to one thousand in normal saline solution was used, or for local application a three per cent solution on a cotton swab. The results are roughly summarized as follows:

In acute and recent cases of trachoma, the three per cent solution or the stick rubbed into the conjunctiva of the everted lids had a really excellent effect.

It is of value in chronic dacryocystitis, but of little effect in diplobacillary ophthalmia or ophthalmia neonatorum. A few cases are briefly tabulated, both favorable and unfavorable results. W. R. P.

On Superficial Linear Keratitis, Together With an Account of the Pathologic Examination of Two Affected Eyes.

SPICER, W. T. HOLMES, AND GREEVES, R. AFFECK (*Ophthalmoscope*, March, 1916), report seven cases of superficial linear keratitis, in two of which one eye was enucleated and pathologic examination made.

The clinical features are sudden onset with pain and congestion in an eye, the appearance of a number of superficial ridges of epithelium in the cornea raised from the general level of the corneal surface, for the most part vertical in arrangement, gray in color with tapering ends, not reaching to the limbus. Under magnification the ridges are double contoured with a comparatively clear center; they are denser and thicker in places, giving an appearance of nodes at more or less regular intervals. As a rule, the ridge does not stain with fluorescein as a whole, but punctate staining along its course is common, especially over the nodes.

The affected eye is, as a rule, very slightly or moderately congested. No iritis and no corneal precipitates are present.

One remarkable feature, which is almost always present during at least some portion of the attack, is a softening of the eye so that tension falls to — 1 and often to — 2; during this time of diminished tension the vision is greatly impaired, and in one case it dropped to 2/60. The attack itself lasts from a few days to a week or longer, and as the ridge disappears the vision recovers and the tension becomes normal again; sometimes the diminution in tension lasts only a few hours. The only condition left behind after each attack is a slight grayness or visibility of the corneal epithelium along the track. If the attack does not recur, this grayness passes, but where a succession of attacks goes on for months, a permanent grayness is established, which in the worst cases makes the corneal surface opaque.

Pain varies, but in the worst cases is considerable, especially with the diminished tension. There is no anesthesia of the cornea. It is mostly young adults who are affected.

Nothing has been found of real or permanent value in treatment. The immediate attacks yield to ordinary treatment, but recurrences are not influenced.

The disease is clearly epithelial, with an underlying neuropathic element, as evidenced by the diminished vision. The latter is probably the essential feature, and the lines produced may be a kind of crumpling or folding of the relaxed Bowman's membrane.

The case reports are given in detail.

Pathologic examination showed the raised lines in the corneal surface to be due to ridges in Bowman's membrane. These ridges vary in appearance in different places, some narrow and sharp, Bowman's membrane being raised into a single well marked fold, while the majority are broader and show a double elevation. They may broaden out into a series of ridges. All are characterized by the presence of new fibrous tissue in the immediate underlying substantia propria.

W. R. P.

Some Practical Points in Eye Work.

Duane, Alexander (*Archives of Ophthalmology*, September, 1915). The first is the application of argyrol. Duane believes in using argyrol after first flushing out the eye with some indifferent solution. The eye is then again flushed out after a few minutes, and a second drop of argyrol is instilled. He also uses it to test the patency of the nasolacrimal duct.

He calls attention to Prince's copper sulphate treatment of trachoma and allied conditions, and says that it has given excellent results in nontrachomatous follicular processes.

Measurement of the Pupil.—A millimeter scale placed in contact with a + 2.75 D. lens is held in front of the pupil, and the number of millimeter that the latter subtends, when seen through the glass, is read off by the observer, who should be stationed at about the focal point of the lens. This measurement is very accurate.

Reaction of Pupil.—The patient stands in a dark room, covers one eye and looks with the other straight at the light. The observer focuses the light with a strong lens on the cornea. and through another lens watches the play of the pupil as the light is thrown on the cornea and as it is withdrawn.

Measurement of Interpupillary Distance.

Measurement of the Angle of Convergence.

Duane also recommends ophthalmoscopy with the refraction of the patient corrected, and states that the examination of the corneal surface by daylight often affords better information than can be obtained by oblique illumination.

In the mapping of scotomata he calls attention to the advantage of a double object test, and describes the test in which complementary colors are used. G. S. D.

Fibroadenoma of the Ciliary Body.

Bruecken, A. J. (*Archives of Ophthalmology,* September, 1915). The patient, sixty-three years of age, noticed six years previously a small enlargement of the skin at the inner canthus of the left eye. It increased rapidly in size and was burned away by a physician. Recurrence took place, and a sloughing cavity apparently involving the eye developed. The eye was removed by enucleation.

Microscopically there was seen in the anterior portion of the ciliary body a small tumor mass not over 0.75 millimeter in diameter, which the writer calls a fibroadenoma of the ciliary body.

The tumor mass itself consisted of a sharply defined body made up of aggregations of epithelium cells imbedded in an abundant homogeneous, vacuolated substance.

The writer discusses tumors of the ciliary body and cannot explain this growth to his own satisfaction. It may be that it represented a simple papillomatous growth due to irritation.

G. S. D.

The Protection of the Normal Crystallin Lens Against the Harmful Effect of Ultraviolet Light.

Burge, W. E., and Neill, A. J. (*Archives of Ophthalmology,* September, 1915). In the first experiments an attempt was made to determine whether opacity of the lens or cataract could be produced in excised pig and ox lenses by radiant energy.

Series No. 1 deals with the effect of infrared and red rays. Lenses were arranged on floats almost completely submerged in egg white and blood serum. By suitable means a light of two thousand candle power was focused on them, also the image of the sun. Opacity could be produced in a very few minutes, but in every case it was found the temperature of the lens was raised sufficiently high to coagulate its protein.

Ultraviolet.—Lenses were introduced into quartz tubes filled with egg white and blood serum, and exposed to a Cooper-Hewitt quartz mercury vapor burner operating at twenty-five hundred candle power. At the end of twenty hours' exposure, although the egg white and the blood serum were firmly coagulated, the lenses were still transparent. This condition continued up to the end of one hundred hours.

These experiments would seem to show that it is impossible to produce an opacity of the lens by means of the infrared or the ultraviolet rays of the spectrum. Since analyses have shown the great increase in the amount of salts contained in cataractous lenses, experiments were carried out using the same apparatus as in the previous series, but with solutions of calcium chlorid, magnesium chlorid and sodium silicate as media; and since cataract is found in diabetes, a solution of dextrose was also used.

From these experiments it appeared that the lens protein was so modified by the solutions used that it could be coagulated by ultraviolet radiation and an opacity of the lens produced.

It appeared that the same substances which modified the lens protein also decreased the fluorescence of the lens. This suggested that there might be some relation between the fluorescing property of the lens and its ability to resist the ultraviolet radiation.

Experiments were then made with ultraviolet rays or nonfluorescing and fluorescing bacteria, and it was found that of seven different kinds of the first variety none were alive after an exposure of two hundred seconds, while none of the cultures of the latter form of bacteria were completely destroyed after a similar length of time.

The writers advance a provisional hypothesis that the "great resistance exhibited by the lens and by fluorescing bacteria to the action of ultraviolet may be due to this power of fluorescing. The assumption is that the lens and fluorescing bacteria by converting the absorbed short waves into longer waves get rid of more or less of the energy which otherwise would have been spent in coagulating their protein." G. S. D.

Some Unusual Changes in the Visual Fields the Result of Vascular Lesions in the Brain and Optic Nerves.

POSEY, WILLIAM CAMPBELL (*Archives of Ophthalmology,* September, 1915). The first case is that of permanent quadrant and hemianopic losses following socalled "migrainous attacks" occurring in a woman, aged forty-six years, who presented herself with an homonymous quadrant defect. The fundi showed marked vascular sclerosis. Posey believes that the lesion was in the cuneus from the thrombosis of the terminal artery or the prolonged spasm of the walls of the vessel.

He considers similar cases reported in the literature, and concludes that homonymous quadrant defects are of rather rare occurrence; moreover, the visual loss consists in a full hemianopic defect as in case 2:

A woman, aged thirty-three years, lost one-half of the visual field following an attack of severe pain in the left side of the head. There was temporary loss of sensation in the right arm and leg. The case was seen by Dr. Frazier and Dr. Spiller, who regarded it as one of migrain with a persistence of the hemianopic defect, and the lesion was supposed to be near the left internal capsule implicating the optic radiations.

A number of similar cases occur in the literature, some of which came to autopsy. In one a clot was found in the cuneus; in another, obliteration of the artery of the fossa of

Sylvius was found. In these cases there was a tendency to regard the migrain as an exciting cause of the organic brain disease, and while such lesions occur in individuals who are predisposed through vascular disease, it also seems that the vascular lesion may occur even in some adults with healthy vessels.

The third case was one of migrain in which varying scotomata were present at different times. These scotomata reached their height when the headaches were most intense, and were of varying shapes.

Posey then reports a case of hemianopsia probably due to pressure atrophy in consequence of atheroma of the internal carotid or the ophthalmic artery, and also one in which there was shown hemianopic defect confined to the lateral region, supposedly due to the blocking of an end artery in or near the cortical center of the visual area. G. S. D.

The Present Position of Sclerotomy, With Especial Reference to the Danger From Late Infection.

Butler, T. Harrison (*Archives of Ophthalmology,* November, 1915), thinks it is now clear that most of the methods used to obtain a filtering scar are equally efficient, although the majority of operators prefer trephining, and a few give preference to the Lagrange, Holth or Herbert operations.

In answer to the question as to whether the results of sclerotomy show a marked superiority to those of iridectomy, it is manifestly too early as yet to give a final answer. For a satisfactory answer to this question, it is necessary that the majority of cases shall have been followed up for five years or more.

In a paper presented in 1914, Butler and Jameson Evans reported the results of one hundred and sixty-one personal operations extending over a period of five years, and were surprised to find they had obtained results from simple iridectomy which were as good as those following sclerotomy. The sclerotomies included the indiscriminate use of the four operations previously mentioned, only five, however, of Herbert's operation being performed. During the past six months Butler has seen eight cases of late infection leading to the total loss of four eyes, and he therefore concludes that sclerotomy is so dangerous that it must be reserved for selected cases only.

Butler and Evans found that iridectomy was successful in seventy-five per cent of cases in all forms of glaucoma. Only one eye has been lost by them after iridectomy. Iridectomy is far easier than sclerotomy. The only valid objection to iridectomy is that it may fail to reduce the tension in cases of chronic glaucoma. In such cases it is easy subsequently to trephine the eye. Butler prefers a small iridectomy to a large one, as being less dangerous.

The Objections to Sclerotomy.—The technic is difficult. It is very difficult to obtain a satisfactory filtering scar. The anterior chamber may reform late. Sclerotomies are much more liable to slight iritis. The occurrence of late infections; these may be acute and lead to destruction of the eye, or mild, in which case recovery takes place.

Finally he reports eight late infections, four acute and four slight, occurring in his practice and in that of Mr. Evans. As a result, Butler feels that sclerotomy is not the best primary operation. Why employ it before the simpler and safer operation has been tried and has failed? G. S. D.

The Ciliary Glands.

Finnoff, W. C. (*Archives of Ophthalmology,* November, 1915). This is a candidate's thesis for the degree of Doctor of Ophthalmology, University of Colorado, and contains a number of exceptional plates. The anatomy of the ciliary body is considered in detail, and the question of ciliary glands is taken up and discussed.

Nicati's experiments are cited as almost conclusive proof that the aqueous comes from the ciliary body, and represents a transudate rather than a secretion.

Finnoff concludes that the presence of a gland-like structure composed of pigment epithelium, situated deeply in the substance of the ciliary body, is highly improbable. Thus the presence of the socalled glands of Treacher Collins is doubtful. The aqueous humor and nutrient fluid of the vitreous are probably secreted by both layers of epithelium which cover the ciliary body from the ora serrata to the root of the iris.

G. S. D.

Malignant Uveitis Treated With Thyroid Extract.

Bordley, James, Jr. (*Archives of Ophthalmology*, November, 1915), reports on eight patients, in all of whom the course of the disease was slowly progressive, beginning with photophobia and followed by loss of visual acuity. Exudates then appeared on the posterior corneal surface, comprising small dots and irregular masses and large plaques. Dilatation of the pupil and greenish discoloration of the base of the iris were early symptoms. A large number of cysts were found in the bulbar portion of the conjunctiva. A vitreous cloud, looking at first not unlike a thin dotted veil, appeared.

In not a single case was any lesion of the socalled vital organs found. In every case there was a positive tuberculin reaction, and in three a focal reaction occurred in the diseased eye.

The usual remedies produced no improvement, and the only therapeutic agent which seemed to help was thyroid extract. Bordley believes that in the treatment of these cases we have to do with two factors: an infection, and the resistant forces on the part of the eye. He believes that some eyes lack a certain degree of ability to react properly against the disease, and wishing to test this hyopthesis, he has used extracts of various tissues of the eyes of sheep, hogs and calves. The result was a failure.

In the hope of getting better results he began to use thyroid extract, and in all eight cases have been treated: four with marked success, two doubtful, and two failures. Of these he discusses five, and gives extensive case histories. G. S. D.

Gram Negative Diplococci Occurring in the Conjunctival Sac.

Blue, Robert (*Archives of Ophthalmology,* November, 1915). After a consideration of this subject, Blue comes to the conclusion that a purulent conjunctivitis which shows Gram negative diplococci resembling gonococci should be treated as a gonorrheal ophthalmia, and in the presence of a urethral discharge or definite history of infection, a definite diagnosis of gonorrheal ophthalmia should be made.

A purulent conjunctivitis in a person nursing a case of epidemic meningitis or giving a history of recent exposure, should be treated as a gonorrheal ophthalmia and the diagnosis withheld until substantiated by cultures.

Mild conjunctivitis showing Gram negative diplococci should be treated symptomatically, but immediate laboratory measures should be initiated to establish a definite diagnosis.

The diagnosis of a mild gonorrheal infection is not proper without exhaustive laboratory diagnosis. G. S. D.

A Primary Tumor of the Optic Nerve Successfully Removed, With Preservation of the Eyeball, by the Kroenlein Method.

KNAPP, ARNOLD (*Archives of Ophthalmology,* November, 1915). This occurred in a boy aged nine years. Prominence in the right eye had been noted for a year, and had been slowly increasing. The eyeball was pushed forward in the axis of the orbit. Sight reduced to perception of light. Disc showed neurotic atrophy.

The Kroenlein operation was performed, and the finger encountered an elongated swelling continuous with the optic nerve extending from the eyeball to the apex of the orbit. Between the tumor and the eyeball was a small portion of apparently normal optic nerve. The tumor was isolated from the surrounding tissues and the nerve divided and then cut off as near the apex of the orbit as possible.

Following the operation there was a decrease in the motility of the eye to the outer side, which subsequently improved considerably, and the final reported result appears to have been an excellent one.

Microscopic examination showed a general neuroglial proliferation with myxomatous-like degeneration. A remarkable feature in this case was that, notwithstanding the complete division of the optic nerve, the retinal circulation apparently was unaffected for at least three weeks. Subsequently some of the vessels, though not all, became narrow and obliterated. Thus a collateral circulation from the posterior ciliary blood vessels must have taken place.

Knapp draws attention to the incomplete removal of these optic nerve tumors, which, according to Hudson, occurs in fifty per cent. In the case reported here the growth unquestionably had extended into the cranial portion of the optic nerve.

He agrees that Byers is correct in warning against the assumption that these tumors may be regarded as almost benign, and suggests that systematic X-ray treatment should become the rule in all these cases. G. S. D.

The Preventive and Curative Treatment of Pneumococcal Ulcer of the Cornea.

RAMSAY, A. MAITLAND (*Ophthalmic Record,* September, 1915). The writer emphasizes the importance of the prevention and treatment of the pneumococcal ulcers caused by injuries in those affected with disease of the lacrimal sac. Prophylaxis lies in the hands of the general practitioner, who should recognize the importance of the disease.

A suppurating tear sac in a person exposed to corneal injury should be immediately extirpated.

Members of the laboring classes should be warned of the dangers of neglect of even slight injuries. When the disease is once developed, patient should be referred immediately to a specialist.

Ramsay can confirm the favorable reports on the use of ethylhydrocuprein in these cases. He uses it in a one per cent solution, and applies it locally to the ulcerated surface. These applications are repeated two or three times daily, and a few drops of the solution are instilled every hour of the day. It is understood that the presence of the pneumococcus in the ulcer has first been demonstrated. He emphasizes the importance of fresh solutions of ethylhydrocuprein. Solutions not more than a week old should be employed invariably.

G. S. D.

Report of a Case With a Foreign Body Located in the Lens.

ALTER, FRANCIS W. (*Ophthalmic Record*, September, 1915). This was a case where the original injury was trifling. Cataract developed. Foreign body was later located in the lens, and extraction of it and the lens performed. G. S. D.

Progress in the Treatment of Cataract in India.

SMITH, LT. COL. HENRY (*Ophthalmic Record*, September, 1915), calls attention to the great increase in the number of cataract extractions in India, over thirty-one thousand operations being performed each year. He believes that more than sixty thousand will be performed twenty years hence. He calls attention to the great value of this material for teaching, and believes that all those who wish to perform his operation should be instructed by him on the patient rather than by lectures and demonstrations elsewhere. G. S. D.

The Report of a Case of Mirror Writing.

CALHOUN, F. PHINIZY (*Ophthalmic Record*, September, 1915). Patient, a boy aged seven years, with a negative family history, well developed and healthy. Eyes normal except for slight hyperopia. When he went to school his mirror writing was discovered, and by careful training he has now in part overcome it.

Mirror writing has been known many centuries. No one theory has been generally accepted. It is rather common in children with some form of mental deficiency. Also found in some adults who, from accident or paralysis of the right hand and arm, attempt to use left hand and arm in writing. A slight tendency to mirror writing should be considered physiologic, as it is usually regarded the normal writing of the left hand. G. S. D.

Errors of Refraction and Their Average Frequency.

Durand, A. C. (*Ophthalmic Record,* September, 1915). The writer believes that there is a high degree of difference in results among oculists where a high degree of uniformity is quite possible. G. S. D.

An Unusually Happy Result Following the Removal of an Intraocular Foreign Body Which Had Been in the Eye Nearly Four Months.

Elwood, Calvin R. (*Ophthalmic Record,* September, 1915). The eye showed a perforating wound of the iris in the inferior segment, but no traumatic cataract. Radiograph showed a foreign body free in the vitreous. A scleral incision was made and the foreign body extracted. Patient made a prompt recovery, and obtained a vision of 20/15. G. S. D.

Pemphigus of the Conjunctiva—Report of Two Cases.

Stieren, Edward (*Ophthalmic Record*, October, 1915). Pemphigus of the conjunctiva is a rare condition, occurring somewhere in the neighborhood of five times in forty-five thousand cases. The frequency of ocular involvement in pemphigus of the skin is apparently not great. Its occurrence is almost invariably incident to a general bullous eruption of the body. Vesication is rarely observed in the eyes, since the conjunctival epithelium is so delicate that the vesicles soon burst and are seldom seen. The ocular disease appears as denuded areas or cicatrices.

The writer then reports two cases, both presenting a typical appearance.

Not much is known about the bacteriology of pemphigus.

In regard to the pathology, Adam found the changes decidedly different in the eye than those found in pemphigus of the skin. The difference consists mainly in the absence of bullæ; an inflammation of the subepithelial and adenoid elements later passing in cicatrization with raised nodules on the surface of the conjunctiva.

The shrinking of the conjunctiva is due to cicatricial changes in each nest of infiltration. The bulbar conjunctiva soon becomes tightly adherent to the sclera at the site where the nodules occur, resulting in the formation of vertical folds. The treatment as a rule is entirely unpromising. G. S. D.

Late Infection Following Corneoscleral Trephining.

Crouch, J. F., and Clapp, C. A. (*Ophthalmic Record,* October, 1915). In the case reported, eleven months after operation patient returned with an acute conjunctivitis in a trephined eye. Two days later the bleb was found collapsed and a fibropurulent exudate was present in the anterior chamber. Tension rose; it gradually fell, however, and the exudate disappeared. Patient left the hospital some two weeks later with floating vitreous opacities. G. S. D.

The Treatment of Trachoma.

Allport, Frank (*Ophthalmic Record,* October, 1915). The underlying principle of Allport's method is frequent expression of the lids with Kuhnt's forceps. He employs squeezing rather than stripping, as being less mutilating to the conjunctiva. He believes that the vigorous scrubbing of the conjunctiva or scraping with files, rasps, etc., frequently produce undesirable traumatism. Following squeezing of the lids he powders the conjunctiva lavishly with boracic acid, which is rubbed gently into the tissues with a small child's tooth brush, then washed off with water. A certain amount of hemorrhage is desirable. Ice cold applications are then applied, followed by soothing and antiseptic treatments for several days. Following this, he uses the copper stick and also a dilute citrin ointment. In from one to two weeks the little operation with Kuhnt's forceps is repeated. This must be repeated again and again until a cure has been effected, which will usually take place in about three months. G. S. D.

Spontaneous Reattachment of the Retina After Twenty-two Years' Duration—Report of the Case With Remarks.

Davis, A. Edward (*Ophthalmic Record,* October, 1915), has been unable to find a reattachment of the retina after so long a period. He cites the case of Frankel, of eleven years' duration, which did not yield to treatment, but recovery took place spontaneously.

The present case is a patient eighteen years old. Seen first in 1897, with the history of a fall when six years of age. Following this fall vision became bad in left eye, which showed a detachment of the retina involving almost the entire lower half.

Eleven years later the eye was reexamined. The retina was found to be completely reattached, although the field was not restored. Patient had a tubercular history and gave a positive reaction to tuberculin.

Davis believes that choroiditis of a tubercular nature developed and that the retina became bound down to the choroid.

G. S. D.

Eye Protection for Grinders and Machinists.

Davie, H. W. (*Ophthalmic Record,* October, 1915). Men grinding manganese or high carbon steel should be protected from the harmful glare as well as from grit and dust. The desirability of light amber colored lenses has been proved. Workers are much more comfortable with these than with the colorless glasses. It is important that a heavy chipper's glass should not be given to grinders, machinists and others who do light work.

G. S. D.

A Case of Epibulbar Sarcoma.

Hansell, Howard F. (*Ophthalmic Record,* October, 1915). The tumor was about the size of a marble, not particularly hard, situated on the outer upper quadrant of the sclera about eight millimeters from the limbus, and was removed under local anesthesia. Its base formed a part of the sclera. Five months later there had been no recurrence.

The pathologic diagnosis was small, round cell sarcoma. The majority of these cases occur in persons of advanced years. They are as a rule melanotic. Their tendency is not to penetrate the globe, but to recur locally and to produce metastasis.

When sarcoma is limited to the outer membranes of the eye, early and thorough excision with cauterization of the base may be curative, but involvement of the intraocular tissues, recurrence or rapid growth are indications for enucleation.

G. S. D.

Some Unusual Features in the Case of a Senile Cataract Extraction.

BURNHAM, G. HERBERT (*Ophthalmic Record*, October, 1915), uses a one in twenty lotion of carbolic acid to irrigate the eyeball after performing extraction. The speculum is then removed, the eyelids closed, and a piece of ice one-third the size of the hand, wrapped in one thickness of cheese cloth, is placed in position. As it melts a new piece is applied. Burnham uses ice after every senile cataract extraction. G. S. D.

Ocular Phenomena Accompanying Three Cases of Gastrointestinal Disorder.

WOODS, HIRAM (*Ophthalmic Record*, November, 1915). Case 1.—Chronic uveitis, apparently traced, after two years, to alveolar absorption. Left eye was first affected, but after a year right also became involved. Some months later, large upper left molar was extracted and a drop or two of pus followed. This was followed by a flare up in the eyes with lowered vision, which gradually improved under diaphoresis. Patient also suffered from gastrointestinal disturbance. He was seen by two eminent internists, both of whom thought that the gastrointestinal condition and condition in the eye could have been caused by the absorption from the alveolar pus sac. This case has shown continued slight improvement since the tooth was extracted. There is still, however, a chronic uveitis though the vision is normal.

Case 2.—Paracentral scotoma, with marked loss of vision. Examination revealed almost complete obstruction of the transverse colon. Operation proved this to be due to a band of fat around the colon, and also showed gall stones, which were removed.

Patient made a good recovery from his operation, and regained normal central vision, and the scotoma disappeared from the right eye. Patient had another attack during the past year, at which time traces of sugar were found in the urine. After a week of free purgation, rest, regulation of diet, etc., scotomata disappeared.

Case 3.—Shifting toxic (?) scotomata. Patient, a man of forty-two years, a high liver, noticed from time to time dim areas in one or the other eye. There was some loss of vision. Various examinations showed scotomata in different parts of the field in both eyes. Under careful diet and the use of cathartics, patient was relieved of his symptoms, and had been free for a year when last seen.

Woods discusses the relation between infection in the intestinal canal and eye symptoms, and concludes that "when we attempt to trace a path from an intestinal infection, even admitting the existence of toxins, to perverted eye function or lesion, we are without a solid basis for reasoning." "There remain only observed clinical facts; yet these facts are too suggestive to allow dismissal." G. S. D.

Iritis Due to Influenza.

Reber, Wendell (*Ophthalmic Record,* November, 1915). The patient showed a well marked iritis. Complement fixation tests were performed, all of which were negative except that there was a faintly positive test to influenza. Patient was given an injection of influenza mixed serobacterin, with very marked relief of pain. The eye was very much quieter, and there was rapid improvement in all the symptoms. Ordinary local treatment was also used. Duration of treatment was six days, and then patient returned to his own doctor and was treated for three weeks with mercury and iodid. A recurrence took place, which was also treated with an injection of serobacterin, with similar good results. G. S. D.

The Consideration of Systemic Diseases Affecting the Ocular Tissues.

Brawley, Frank (*Ophthalmic Record,* November, 1915), considers the general question of systemic diseases in relation to diseases of the eye and the special relation to disturbances of the gastrointestinal tract, and then reports several cases where the relationship between the two systems seems close.

Brawley believes that in metabolic studies we have a very valuable weapon with which to combat eye diseases. He regrets the fact that there are so few internists properly equipped for this work, and also points out the difficulty caused by the expense of the laboratory work. G. S. D.

An Operation for Secondary Cataract.

Green, A. S., and Green, L. D. (*Ophthalmic Record,* November, 1915). The writers point out that it is the practice of Col. Henry Smith to remove the remaining capsule in all cases of secondary cataract that come to him. He makes an incision in the sclerocorneal margin as for an iridectomy. If there are posterior synechiæ, they are separated with a flat iris repositor. An iris forceps is now introduced into the anterior chamber and the blades pushed through the cataract. This is seized and withdrawn. A drop or two of vitreous is always lost, but this is of little consequence.

As in some cases it requires considerable force to penetrate the membrane with iris forceps, the writers have devised a new instrument. This is a forceps with one blade a knife needle, while the other is a grooved and toothed forceps blade. The needle blade is pushed through the membrane and the upper blade closed down upon it, the membrane thus withdrawing. G. S. D.

Congenital Aphakia With Microcornea.

Adams, Eldridge (*Ophthalmic Record,* November, 1915). This case showed convergent, alternating, concomitant squint. The corneæ were oval. There was a symmetric circular opacity in the center of each cornea. The lens in each eye was absent, and there was a well marked microcornea.

G. S. D.

Sudden Blindness Due to Suppuration of the Accessory Nasal Sinuses.

Stark, H. H. (*Journal American Medical Association,* October 30, 1915). The author reports three personal cases, and quotes from the literature of eighty-eight collected cases.

Case 1.—A man, aged thirty-five years, had a fracture of the skull and a trephine operation. One month after the injury he consulted the author for a paralysis of the right externus muscle which had existed since the accident. Three months later the vision of the left eye suddenly failed to 20/100. No definite fundus changes were found. Examination of the nose showed pus coming from under the middle turbinate on the left side. There was an absolute color scotoma. The ethmoids were drained by removing the anterior end of the middle turbinate. In five days his vision went up to 20/20, though the color scotoma did not disappear for a year.

Case 2.—A woman, aged twenty-three years, was seen six days after sudden failure of vision in the left eye. No fundus change was found. There were some polypoid changes in the turbinates, but no signs of pus. Vision was 20/100. After removal of the anterior end of the middle turbinate there was very little discharge of pus for eight days, when a flow of pus was established, and the vision increased rapidly to 20/40. About three months later, the symptoms not having been entirely relieved, the ethmoids were opened and curetted, after which the vision rapidly improved to 20/15.

Case 3.—A man, aged forty years. The vision in the left eye had suddenly failed to 20/30. There was no change found in the fundus, but an absolute central color scotoma for red and green. Operation was refused, but later, after a sudden discharge of half a dram of foul smelling pus from the right side of the nose, vision immediately improved to normal.

The author describes in detail the symptoms collected from the eighty-eight cases, which are as follows: The optic nerve was involved in fifty-two cases, nine of them being optic atrophy, forty-three optic neuritis, five of the neuritis cases showing a choked disc.

In the nine cases of optic atrophy the seat of the trouble was: Maxillary sinus, 1; ethmoid, 3; ethmoid and sphenoid, 2; not located, 3.

In the cases of optic neuritis the seat of trouble was: Maxillary sinus, 3; maxillary and ethmoid, 1; maxillary, ethmoid and sphenoid, 2; ethmoid, 18; ethmoid and sphenoid, 8; sphenoid, 8.

Of the fifty-two cases the ethmoid was involved in thirty-three, showing the preponderance strongly in favor of the ethmoid cells in this trouble.

Dilatation of the pupil is also mentioned as one of the symptoms. In the cases investigated the pupil of the affected eye was dilated in eighteen, contracted in four. Exophthalmos was mentioned as a symptom seventeen times. The external muscles were involved in eleven cases. Restriction of the visual field was mentioned three times, all of them being cases of long standing. There were fourteen cases in which scotoma was mentioned, but all of them were not confined to the central field. The most definite sign, in the author's opinion, is that of central scotoma. Central scotoma was reported in twelve cases. Enlargement of the blind spot is a symptom upon which there is still some doubt.

In summing up the question of causation, the author remarks: "I believe we can safely say that all the symptoms enumerated can be ascribed to the same cause, one being simply a different degree of the other, the primary stage being a slight involvement, the maximum stage represented sometimes by orbital abscess or direct infection. Other cases in which there is no orbital infection and a loss of vision coming on after slight improvement, to my mind show the shrinking which takes place after the cause is removed, which shrinking causes constriction of the optic nerve. If we accept this theory, it not only explains this condition, but explains many cases of muscular asthenopia, and possibly many cases in patients who have defective central vision which has been ascribed to amblyopia ex anopsia." E. S. T.

Malignant Tumors in and Around the Orbit, With Report of Starvation Method of Treatment.

Cary, E. H. (*Journal American Medical Association*, October 30, 1915). . The author quotes briefly the results of ligation of arteries for malignant growths in the general surgical literature, and reports in detail fifteen cases, mainly sarcoma in various parts of the face and neck, with nine cases of carcinoma. His conclusions are as follows:

"1. (a) All branches of each external carotid must be tied.

(b) In the majority of cases both sides can be operated on without an interval of two weeks, and this without shock.

(c) Sarcoma offers the best results.

2. It may be noted that all the sarcomas occurred on the left side except two. As the common carotid arises from the transverse portion of the aorta, a morbific tendency might find nourishment in excess from this circumstance.

3. Circulation from the ophthalmic branch of the internal carotid does not prevent the value of the operation in the orbit, as Dawbarn concluded.

4. In this group of cases sarcoma occurs in all ages. In females it occurs most often beyond the age of nineteen, and in males, under this age.

5. Cancer occurs in this group oftener in males and only in one case under forty-six years of age, which was the ethmoidal case of twenty-eight years, coming under case 6 (sarcoma).

6. I have not found in any of my cases an anomaly in the carotid distribution.

7. The results seem best when the tumor is not disturbed, suggesting traumatism at the site, always an exciting factor.

8. Though I have not practiced ligating uniformly the accompanying veins, it may be better to do so.

9. Although certain carcinoma cases were treated with the Roentgen ray, no good results were observed.

10. In two cases in which tumors involved the optic nerves, both demonstrate that the optic nerve tracts reach the chiasm and there decussate; when a nerve proceeds to its destination, the respective nasal half possibly, and the temporal half probably, are separately sheathed, as is also the papillomacular bundle of fibers, which are intact and which may be disturbed but not destroyed.

My observation has been that a distinct deterring influence is exerted in the carcinomatous growth, but that is the best that can be said." E. S. T.

Postoperative Detachment of the Choroid, With Especial Reference to Elliot's Operation for Glaucoma.

Barkan, Hans (*Journal American Medical Association*, October 30, 1915). There are, broadly speaking, four classes of detachment: First, tears of the ciliary body with the aqueous percolating into the suprachoroidal space; second, traction on the choroid and retina by organizing masses in the vitreous; third, hemorrhage in and beneath the choroid from ruptured vessels; fourth, inflammatory detachment. The author discusses the causation and characteristics of the condition, and concludes:

"1. Clinically demonstrable postoperative detachment of the choroid takes place after cataract operations, with or without iridectomy, in about four per cent; in Elliot's trephine operation, in about ten per cent; in Lagrange's sclerectomy, in about twenty per cent; it does not occur in linear extraction, or simple iridectomy.

2. The sine qua non for its existence is low intraocular tension, caused by abnormally rapid escape of aqueous through the wound, extending over some interval.

3. The chamber is not shallow or absent because of the detachment; the detachment is secondary to the condition of the chamber.

4. The fluid responsible for the detachment is derived, probably, from the choroidal blood vessels, and not improbably from the veins.

5. Choroidal detachment is of relatively frequent occurrence after Elliot's trephine operation, and should, if for statistical purposes only, be looked for, and its occurrence noted in all cases of Elliot's operation." E. T. S.

Oxycephalic Exophthalmos With Traumatic Rupture of Both Eyes.

Fenton, Ralph A. (*Journal American Medical Association,* October 30, 1915). The case was a white man, forty-seven years old, with the socalled "tower skull." Vision has been defective since childhood. When thirty-nine years of age his right eye was torn open and blinded by a flying fragment of a broken claw hammer. At forty years he had an attack of measles, after which the left eye protruded and several corneal ulcers occurred. The scleral tissues gradually stretched, and finally, after a slight blow from a flying branch, the left eye suffered a complete rupture back of the limbus and in front of the insertion of the internus muscle. E. S. T.

Sclerotrephine Operation for Detached Retina—Clinical Report of Eleven Cases.

Parker, Walter R. (*Journal American Medical Association,* November 13, 1915). The first case of this operation reported by the author was on May 19, 1913. Since that time fifteen operations have been done on eleven patients, all of which form the basis of the present paper. The sclera is first trephined, and then an incision with a cataract knife is made in the choroid, or in the choroid and retina, and the subretinal fluid, and, in most instances, a few drops of vitreous, were allowed to escape. A two millimeter trephine is used. The operation is, of course, done after laying back the conjunctival flap, which is returned to its place by sutures after the intraocular fluids have been allowed to escape. The histories of these interesting cases are given in detail, and the results were as follows: The vision was improved in four cases, unimproved in five, made worse in two. The fields were improved in eight, and made worse in three. In summing up, the author says:

"The object of this operative procedure has been to secure an opening in the sclera and choroid which will allow free drainage of the subretinal fluid for a sufficient length of time to permit the retina to become reattached. If the secretory process is dormant, and all the subretinal fluid evacuated at the time of the operation, reattachment may occur without edema of the conjunctiva. But if the secretory process is active, or if any amount of the subretinal fluid is left behind, a certain amount of reaction must necessarily follow or the retina will again be separated from the choroid and failure result. In each of the cases in which a good result was obtained the operation was followed by a marked edema which did not entirely disappear until the tenth day.

"The procedure seems to be unattended by any danger, either of impairing the integrity of the globe, or, in uncomplicated cases, of increasing the extent of the detachment. On theoretic grounds at least it would seem desirable to drain off the subretinal fluid without injuring the retina. In the cases reported, however, the best results were obtained when escape of the subretinal fluid was followed by a discharge of a small amount of vitreous.

"The results obtained in the eleven cases here reported, as compared with those obtained from any like number of cases previously treated, compel the author to look on the operation as one of distinct value in the treatment of detachment of the retina." E. S. T.

Detachment of the Retina.

Thomson, Edgar S., and Curtin, Thomas H. (*Journal American Medical Association,* November 13, 1915). The authors review the three principal theories of causation of retinal detachment, namely, those of von Graefe, Leber and Rählmann, and conclude that histologic examination has done little to establish any one of them, adding, "Our present point of view must rest on deductions and inference from well known clinical phenomena."

The suggestion of Iwanof, that in highly myopic eyes a detachment of the vitreous humor occurred at the posterior pole, for the reason that the vitreous could not increase in volume as rapidly as the posterior part of the sclerotic was distended, is held untenable, because not borne out by the following clinical facts: Detachments in myopia do not always occur at the posterior pole, and we know the vitreous does rapidly increase in volume through the imbibition of serum. Nor have the status of the socalled retinal rents been satisfactorily established.

Referring to Fisher's theory, the authors conclude as follows: "While this theory has a very attractive sound, it must be remembered that it is for the most part nothing more than a theory, and while it fits certain clinical aspects of the cases, so far as treatment is concerned, little benefit apparently has been secured. Sodium citrat injections, or any form of subconjunctival injections, have given not the faintest glimmer of hope in our hands. We are, however, prepared to subscribe to the theory that the transudation of serum beneath the retina is but a symptom of a deeper intraocular disorder, but cannot altogether feel that it is a progressive degeneration."

The authors believe that the clinical evidence is in favor of the choroid as the origin of the subretinal fluid, and conclude "that, in the present state of our knowledge, we are not justified in assuming anything more than that retinal detachment occurs as the result of a lymphatic derangement leading to exudation from the choroidal vessels." Clinically they emphasize the importance of making a clear distinction between the cases in which the inflammatory symptoms antedate the detachment and those in which the detachment antedates the inflammatory symptom. Surgically they believe it is important not to incise the choroid, lest it lead to reaction and vitreous hemorrhage. On this theory they suggest that aspiration be substituted for incision of the choroid after the sclera has been trephined.

The operation is described as follows: "A curved incision is made through the conjunctiva, with the convexity in the direction of the cornea, and the tissues are taken up down to the sclera. It is wiser at this juncture to put in a single silk suture at the summit of the flap, as otherwise the capsular tissue underneath the flap is apt to be rolled up and the ultimate flap will then be composed of nothing but conjunctiva, leaving more or less thickening and adhesions of the episcleral tissues, which tends to seal up the trephine opening. The entire thickness of tissue is taken up down as far as the sclera, and dissected well back. The assistant then holds this flap back by means of the suture. The trephine opening is then made with a two or three millimeter trephine. We are of the opinion that a larger opening is better, but experience is necessary to decide this point. On the removal of the trephine button there is in many instances a gush of serous fluid from the suprachoroidal space. Examination of the eye usually shows considerable subsidence of the detachment after this fluid has escaped. The flap is then sutured into place and the eye bandaged and the patient put to bed. It goes without saying that the pupil should always be well dilated with atropin before the operation, both for purposes of examining and to keep the eye as free as possible from the tendency of inflammation. There is usually very slight reaction after the trephine operation. In a week or ten days later the patient is put on the operating table and the needle of a small aspirating syringe is inserted into the subretinal space, through the conjunctiva and choroid. The subretinal fluid is then forcibly aspirated, after which the patient is put to bed for a day or two, as circumstances require. The aspiration operation is followed by practically no reaction and can be repeated as long as the trephine opening remains free. In this connection it is very important to have the flap properly made, as if capsular tags are allowed to roll up under the flap, it is difficult to see where the opening lies, and to enter the needle requires a great deal of stabbing around in the dark. If the conjunctival flap heals properly the trephine opening shows as a small dark spot, which is easily identified."

Three cases are reported, the results showing improvement in vision in two cases and no improvement in one case. Besides these cases about ten similar operations were done in old cases of detachment, most of which had lasted a year or more. As no success could be expected in these cases, they were not included in the report.

"In conclusion, it must be emphasized that this procedure gives promise of results only in recent cases, when the light perception in the retina is still retained, when no inflammatory products are thrown out into the vitreous, when the tension is not materially reduced, and when a high degree of myopia does not exist." W. R. P.

Total Removal of the Orbit Under Local Anesthesia.

COLE, HERBERT P. (*Journal American Medical Association,* December 4, 1915). The patient, a woman eighty-one years old, with a recurring melanosarcoma, had also a chronic nephritis, and general anesthesia was considered unwise. A preliminary injection of scopolamin one-two-hundredth grain and morphin one-eighth grain was given one hour and a quarter before operation, and another injection of scopolamin one-two-hundredth grain and morphin one-sixth grain thirty minutes before operation. A line of local anesthesia infiltration was made one-half inch below the lower palpebral margin and carried well down on the malar border. The infiltration was carried into the orbit and close to the orbital floor. A heavy needle was then carried back to the orbital apex and the tissues slowly infiltrated with a one per cent novocain-epinephrin solution. About five cubic centimeters were used. Similarly the upper part of the orbit was infiltrated, and the operation was done without any difficulty. E. S. T.

Syphilitic Iritis With Condylomas—Report of Three Cases.

WEIDLER, WALTER B. (*Journal American Medical Association,* December 25, 1915). The three cases reported are such as are frequently called gumma of the iris, but as all of these lesions were seen during the secondary stage, it is more proper to classify them as papules, or condylomas. It is the author's belief that gummas are rarer than papules—that papules often occur in number, whereas the gumma is single and more often seen near the ciliary body. All three presented the usual appearance of a whitish gray thickening at the iris margin, and recovered well under salvarsan. The Wassermann was plus four in each case. E. S. T.

Soft Eyeball in Diabetic Coma.

RIESMAN, DAVID (*Journal American Medical Association,* January 8, 1916). The author noted a case and, on looking up the literature, found mention of it by ten writers, the references of which are appended. It is probable that the acetone bodies may have a share in the production of the condition. In the second case, that of a woman aged forty-one years, with intense acidosis, the symptom was very marked. E. S. T.

Conservation of Vision and Prevention of Blindness.

De Schweinitz, G. E. (*Journal American Medical Association,* February 5, 1916. This article, to which it is impossible to do justice in the limits of an abstract, primarily refers to the economic importance of the question. "It is safe to say that fully one hundred thousand men, women and children in this country are, within the strict definition, blind." At least twenty-five thousand of which had lost their sight by preventable diseases. These twenty-five thousand, by their blindness, deprive the country yearly of about eight millions of dollars' worth of productive labor. Twenty-five per cent of the inmates of schools and asylums for the blind have lost their sight from ophthalmia neonatorum. About sixty-five per cent of the cases of ophthalmia neonatorum are due to a microorganism of high virulence. In general terms, the measures devised and in operation for the elimination of this preventable cause of blindness are education, compulsory notification, the punishment by law of offenders against properly constructed legal regulations, and compulsory prophylaxis. These points are discussed in detail. Trachoma and glaucoma are also frequent causes of blindness. The author advocates a national committee for the prevention of blindness, which should also be concerned with and interested in the elimination of the evils which spoil eye efficiency. The class of cases whose vision is partially defective are visually handicapped. They do not properly belong in schools for the blind, and should certainly have especial provision made for them. This is already done in the public schools of twelve states in the United States. Classes have also been instituted in Boston, Cleveland, Toledo and Cincinnati for such cases. The author believes that in schools for the blind, and schools where the partially sighted are educated, "much also could be gained by a sensible application of the principles of modern psychologic research," thus endeavoring to ascertain more accurately the needs of the individual cases. E. S. T.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY
Frank C. Todd, M. D.,
MINNEAPOLIS.
J. W. Charles, M. D.,
ST. LOUIS.
Max W. Jacobs, M. D.,
ST. LOUIS.
Harry S. Gradle, M. D.,
CHICAGO.
Hans Barkan, M. D.,
SAN FRANCISCO.

Operation on a Bulbar Cyst With Good Result.

Augstein (*Klin. Monatsbl. f. Augenheilk.*, September, 1913). Cyst size of bulbus, containing vitreous and communicating with eyeball in infant of twelve weeks. Removal of cyst and recovery. After three and one-half years bulbus of normal size, and, excepting for scar of cornea, nothing abnormal. M. W. J.

Changes in Ocular Pressure Through Osmotic Processes.

Hertel (*Klin. Monatsbl. f. Augenheilk.*, September, 1913). Lowering of tension follows ingestion of salt or sugar in rabbits. In patient aged thirty-four years, with chronic glaucoma, tension dropped in thirty-five minutes from seventy-four millimeters Hg. to fifteen millimeters after intravenous injection of two hundred and fifty cubic centimeters of a ten per cent solution of salt. No subjective complaints. Similar results in another. Miotics became more effective after these injections. M. W. J.

Cavernous Degeneration of the Optic Nerve.

Rados (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) saw two cases. One had thrombosis of central vein, followed by secondary glaucoma. The thrombosis, according to histologic examination, must have occurred long before and led to secondary glaucoma without typical excavation but with cavernous degeneration. The second showed a typical excavation. Circulatory disturbances seem to be the principal factor in the production of this condition. M. W. J.

Choroidal Detachment After Elliot Operation.

Schur (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) reports three such accidents in eighty-five Elliot operations. Fuchs reported ten per cent in glaucoma iridectomy and twenty-two per cent after Lagrange operation. M. W. J.

Late Infection After Elliot Operation.

Schur (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) advises careful removal of all prolapsing iris from trephine wound as a prophylactic measure against infection.

M. W. J.

Late Infection After Elliot Operation.

Harms (*Klin. Monatsbl. f. Augenheilk.*, September, 1913) believes that his experience tends to show that iridectomy is preferable in inflammatory glaucoma, both acute and chronic, while the Elliot operation is best in glaucoma simplex, absolutum, perhaps hemorrhagicum, and in hydrophthalmus.

M. W. J.

Observations on the London Discussion of the Newer Glaucoma Operations.

Axenfeld (*Klin. Monatsbl. f. Augenheilk.*, September, 1913). Although Elliot considers the iridectomy of service only so far as it takes care of a possible prolapse, Axenfeld believes it very probable that in certain cases it alone is the factor which brings about filtration from the anterior chamber. Axenfeld finds fewer complications after Lagrange than after Elliot, but concedes that the Elliot technic is easier for most surgeons, although the moment at which the trephine enters the anterior chamber is not always easily judged correctly by the inexperienced. There is no doubt that where a free infiltration under the conjunctiva takes place, a marked lowering of tension occurs. There are eyes which can only be saved by fistulization, and it is our duty to rid this type of operation of the dangers which accompany same. Lagrange believes his operation best suited for glaucoma simplex, and Axenfeld thinks that the indications for the Elliot technic must be more clearly defined. M. W. J.

Is the Cornea Unconcerned in the Resorption of the Aqueous?

HAMBURGER (*Klin. Monatsbl. f. Augenheilk.*, December, 1913) believes the cornea is an organ with powers of resorption, in spite of the contrary teachings in works on physiology. Injections of sodium acid sulphat of indigo into the ear vein of the living rabbit led to staining of the endothelial nuclei of Descemet's membrane. M. W. J.

Specific Therapy of Pneumococcus Infection of the Human Eye, Especially of Ulcus Corneæ Serpens, by Means of Ethylhydrocuprein. (Optochinum Hydrochloricum.)

GOLDSCHMIDT (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913) recommends the use of optochin in the following manner: A one per cent aqueous solution of the substance is instilled hourly into the conjunctival sac in sufficient amount to thoroughly cover the cornea. The solution should remain in the conjunctival sac about one-half minute. This treatment is kept up until the ulcer has become clean and absorption of existing infiltrates has begun. He then continues the treatment with five to ten per cent noviform ointment. Atropin is of course also used. He concludes from the results in his series of cases that optochinum hydrochloricum has a specific and far reaching curative effect on pneumococcus infections of the human eye. Diplobacillus ulcer and actinomycosis of the cornea, as well as staphylococci in the conjunctival sac, remain uninfluenced by this agent. Observations in one case of erosion of the cornea lead Goldschmidt to believe that the drug has a decided prophylactic effect as well. His observations embraced thirty-one cases. The drug is not expensive. M. W. J.

Clinical Observations on the Effect of Ethylhydrocuprein on Ulcus Corneæ Serpens (Pneumococci).

SCHUR (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913) found that normal corneal epithelium is not affected by solutions of this drug up to two per cent strength, and that it is frequently wise to remove the epithelium from the edges of the ulcer. He prefers, on this account, to use cotton pledgets for applying the solution, rather than to instill same. He advises that the solution be freshly made, as old ones seem less efficacious. The moist pledget was held on the cornea until the parts adjacent to the ulcer became cloudy. Results were best when the cloudiness appeared rapidly, and the prognosis could to a degree be based on the rapidity of appearance of this phenomenon. As the application causes a severe burning sensation, cocain was used before the treatment. Schur was able to observe a short lasting partial anesthesia of the cornea, after five to ten minutes, when using a two per cent solution. He considers the drug practically a specific against the pneumococcus. The scars seem more delicate also than after other forms of treatment. M. W. J.

Injuries of the Eye Due to Iron Splinter. (Three Years' Record of the Strassburg Clinic.)

HUTTEMANN (*Klin. Monatsbl. f. Augenheilk.*, September, October and November, 1913) has tabulated fifty-five cases of such injury. Forty-nine were in men, two in women, and four in children. Thirty per cent occurred between the thirtieth and fortieth year. Sideroscope as well as Roentgen ray is used in localizing such foreign bodies. The Hertel sideroscope gave the best results, and Huttemann states that in several cases in which the splinter, because of its smallness, at first gave no reaction with this instrument, magnetization with the Volkmann giant magnet caused the foreign body to influence the sideroscope. Size of the splinter cannot be determined by the amount of movement of the magnetic needle. Distance of the foreign body from the needle, the form of the splinter and position of same are all factors. As such foreign bodies are known to change position, results of examinations made at various times with the sideroscope may not always be uniform.

From these observations there is reason to believe that the danger of siderosis increases with the size of the splinter. One of their cases, however, showed no evidence of siderosis after thirty years. Position of the splinter as regards contact with secretions such as the aqueous is an important factor in the development of siderosis, and tends to increase the danger of same. M. W. J.

Primary Sarcoma of the Iris.

LAVEN (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913). According to figures compiled by Fuchs, primary sarcoma of the iris occurs but rarely—once in twenty-five thousand cases of eye disease. In Hirschberg's clinic only one case was found amongst 83,000 patients. Laven's patient was a twelve-year-old girl of good general health. A pigmented nevus of the right grayish blue iris had been present for several years. Sudden growth of the nevus, especially anteriorly, led to rise of tension, and besides small masses of pigment began to appear at various points on the surface of the iris. Enucleation was promptly done, and one and a half years later no demonstrable or suspected metastasis had appeared. The majority (seventy-six of one hundred and two cases) of sarcomata of the iris have appeared in persons past thirty years. Although most iris sarcomata are melanosarcomata, their development is slow as compared with similar tumors in other parts of the body. Six cases of death from general sarcomatosus following sarcoma of the iris are on record. While local recurrences are less likely after enucleation than after iridectomy, metastases in distant organs do occur even after the radical procedure. That in certain cases the excision of the growth is ample treatment is proven by two cases, in whom, eighteen years after iridectomy, no recurrence had been noted. A detailed histologic report is given by Laven.

M. W. J.

Pathologic Anatomy of Glaucoma Simplex.

RÖNNE (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913) gives a report on a case of glaucoma simplex which responded promptly to treatment with miotics. The patient, a man of fifty-eight years, died of an intercurrent disease.

Typical excavation and fields of vision. Examination of the bulbi showed wide open angle of anterior chamber, with, however, a sclerosis of the superficial layers of the trabecular structure of the spaces of Fontana with deposit of pigment. Nowhere inflammation. Anatomic condition about angle of anterior chamber is abnormal. All organs which touch the cameral angle anteriorly are bent forward. Descemet's membrane ends 1.1 millimeter from the floor of the angle of the chamber. The ligamentum pectinatum is very long, and the most anterior insertion of the ciliary muscle in the sclera is drawn forward so that the apex of the muscle forms the wall of the cameral angle. Optic nerve shows papillary excavation and atrophy of the bundle which belongs to the retinal periphery, but the papillomacular bundle is well preserved.

Rönne does not doubt that the cause of the rise in tension in this case lies in the sclerosis mentioned, but comments on the possible relationship between the condition of the ciliary muscle and the glaucoma. We are accustomed to attribute the results gotten after using pilocarpin and other miotics to the mechanical property which through contraction of the iris lays open the angle of the anterior chamber, permitting thereby the passage of the aqueous into the spaces of Fontana. In this case, wherein the angle is well open and we still have good effects after pilocarpin, the above explanation falls to the ground. Rönne believes from the study of this case that changes in the visual field require a not inconsiderable degree of atrophy of the retinal fibers corresponding to the defect.

M. W. J.

Pathologic Anatomy and Pathogenesis of Buphthalmus in Neurofibromatosis.

MURAKAMI (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913) believes that in his case there was an increase in secretion at one time together with some circulatory disturbance, and that an elevation in tension followed. He thinks it probable that the universal proliferation of connective tissue was productive of pressure on lymphatics and vessels, and caused a stasis with resulting hypersecretion.

M. W. J.

Sarcoma of the Choroid With Reference to Research in Experimental Tumors and the Modern Views on the Histogenesis of Tumors.

LANGE (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913) attributes continued good general condition in a patient suffering with a rapidly growing sarcoma to the fact, pointed out by Ehrlich, that in such growths the resorption of the degenerating tumor masses leads to development of antibodies and, therefore, an active immunity against metastases.

Following the idea of Albrecht, he believes that sarcoma of the choroid is the result of introduction and persistence of abnormal tissue which interferes with the normal closure of the choroidal cleft. He also raises the question, whether metastases developing many years after the primary tumor are really metastases, and not primary tumors arising from cell groups whose development does not synchronize with the first group. M. W. J.

Hypophysis Disease and Eye Symptoms, With Report on Three Cases.

Boer (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913) discusses the well known changes in the visual fields, organotherapy and the operations of Schlöffer and Hirsch; also the "Balkanstich" operation, and gives a review of the subject. M. W. J.

Tuberculin Treatment in Eye Patients.

Bernheimer (*Klin. Monatsbl. f. Augenheilk.*, October-November, 1913) reminds that scrofulous children are unfavorably affected by tuberculin treatment, especially those with suppurating foci. Chronic uveitis is frequently of tuberculous origin, and is treated successfully with tuberculin. While keratitis parenchymatosa in general is a typical eye disease of congenital lues, there is still, without any doubt, a keratitis which is undistinguishable from the former, and which is developed on a tubercular basis. Bernheimer considers eight to ten per cent in this class. Such patients react to tuberculin and get entirely well under that treatment. Bernheimer gives four to six treatments per week (injections of B. E., or albumose-free tuberculin), followed by cutaneous applications continued for a longer or shorter period. In children he uses the cutaneous treatment, and goes to injections only when more vigorous treatment is indicated. He repeats the treatment after three to six months, even if no recurrence has taken place. Altitude and sunlight are essential to successful cures. Recurrences in conjunctivitis and keratitis scrofulosa during 1900-1906, with other forms of therapy, amounted to fifty per cent, whilst during the years 1906-1912, under a system of tuberculin treatment, it was twenty per cent.

M. W. J.

Salvarsan in Sympathetic Eye Inflammation.

Siegrist (*Klin. Monatsbl. f. Augenheilk.*, December, 1913) reports good results in two cases of sympathetic ophthalmia treated with salvarsan. M. W. J.

A Case of Ciliary and Optic Nerve Gumma After Salvarsan.

MATSUKAWA (*Klin. Monatsbl. f. Augenheilk.*, December, 1913). A thirty-two-year-old laborer developed a gumma of the ciliary region and optic nerve, one and one-half years after the appearance of an initial lesion and six months after salvarsan. He believes that his case speaks against a toxic theory regarding etiology of this form of luetic lesion. M. W. J.

Can Idiopathic Detachment of the Retina Result From Physical Overexertion?

PFALZ (*Klin. Monatsbl. f. Augenheilk.*, December, 1913). 1. Clinical observation makes it extremely improbable, and scientific observations seem to exclude it. 2. When detachment has occurred soon after overexertion, we have to deal, not with a fresh detachment, but with the enlargement of an already existing lesion. The severity of the exertion is not a factor, as the detachment is the result of the movements of body, head and eye. M. W. J.

Aplasia of Anterior Layer of Iris.

STREIFF (*Klin. Monatsbl. f. Augenheilk.*, December, 1913). In cases described by Rübel and himself, only the anterior stroma layer of the iris was involved. He attributes these phenomena to abnormal retraction of that mesodermic layer from which originally iris stroma plus pupillary membrane arise. M. W. J.

Congenital Splitting of Iris Into Two Layers.

WIEGMANN (*Klin. Monatsbl. f. Augenheilk.*, December, 1913) concludes that the following opinion comes from the observation of this case: 1. The assumptions of Streiff, that the crypt layer, anatomically as well as genetically, requires a special origin, gained credence from observation of this case. 2. The theory of Munch, that the stroma tissue is a nerve muscle apparatus, finds no support from these observations. M. W. J.

Hemianopic Ring Scotoma. (Incomplete Double Sided Hemianopsia.)

RUEBEL (*Klin. Monatsbl. f. Augenheilk.*, December, 1913). Undoubtedly an existing nephritis with its vascular changes is under consideration. The latter led, after several apoplectiform attacks, to a transitory loss of speech, and, above all, to a permanent break in the left intracranial visual tract, with defects in the right halves of the visual fields. This was followed in twelve years by a lesion of the right intraocular visual path, so that a large ring scotoma resulted. Ruebel considers that as the lesion must have occurred in the cortical region or close by in the visual radiations, the term hemianopic ring scotoma should be used. Ruebel could find no similar case in the literature. M. W. J.

Six Cases of Complicated Hereditary Familiary Optic Atrophy of Childhood (Behr).

TAKASHIMA (*Klin. Monatsbl. f. Augenheilk.*, December, 1913) concludes that we must consider the hereditary familiary optic atrophy, with its initial symptoms, as first described by Behr, as a distinct disease. Long continued observations lead him to the conclusion that the disease has not a progressive course. The beginning of the disease occurs in either fetal life or the first year of life. It does not change in appearance, and is, therefore, diagnosticated from all similar hereditary and nonhereditary ailments. M. W. J.

Operation for Entropion of the Lids.

KOHAN (*Klin. Monatsbl. f. Augenheilk.*, December, 1913) describes his operation as follows:

1. Two vertical incisions are made through the entire lid, the first, one millimeter external to the punctum, the other at the outer canthal angle. Each incision is five or six millimeters long.

2. After everting the lid, preferably with his special clamp (very much like Desmarres'), the two incisions are joined by an incision three or four millimeters from the lid border. The latter goes through conjunctiva and tarsal plate. The anterior wall of the tarsal plate is now separated from the skin and orbicularis muscle, above and below the incision.

3. One curved needle of double armed thin silk suture is introduced into upper portion of tarsus through conjunctival surface, drawn out in space between tarsal plate and separated skin and orbicularis, then reintroduced into skin flap above level of lashes, to emerge on skin above lashes. Other needle introduced into ciliary portion of tarsal plate at bottom

of fossa made in loosening tarsus from orbicularis. Same emerges just posteriorly to lashes, in intermarginal space. Three or four such sutures are used and the ends tied over bits of sterilized woods.

A suture is introduced at each side at the position of the upturned lashes, to emerge in the fossa between orbicularis and tarsus. The suture is then passed through the skin to the other side of the vertical incision at a point three or four millimeters higher than the lower border of the upper portion of the tarsal plate. Same are fastened at the ciliary border.

Kohan asserts that the worst cases of entropion can be completely cured by this method. M. W. J.

Operative Treatment of Ectropion and Trichiasis.

Oretschkin (*Klin. Monatsbl. f. Augenheilk.*, December, 1913) does not tie his sutures in the intermarginal space in the Snellen operation for ectropion, but fastens them to the brow with adhesive.

In trichiasis involving only a few lashes the lid is split at that place in the intermarginal space to a depth of one to two millimeters, and the hair follicles destroyed after everting the tiny skin flap. M. W. J.

Sclerectomy of Lagrange and Trephine Operation of Elliot.

Meller (*Klin. Monatsbl. f. Augenheilk.*, January, 1914) in this publication states that: 1. The number of recurrences was less in both forms of sclerectomy when an iridectomy was also performed. 2. The iridectomy is of greater importance in the Elliot than in the Lagrange.

The per cent of bad results was less after Elliot than after Lagrange. The easier technic of the Elliot, the fewer complications, especially in those forms of glaucoma in which the usual iridectomy was feared, such as acute and absolute glaucoma of the severer type, are to the credit of the trephine operation. According to Meller, at the time of writing this article the Elliot operation is indicated in every form of glaucoma. This operation is, however, not without is failures, and then other less esteemed methods must be used, after all, before we succeed. We can set up a malignant glaucoma by this technic, as well as by other operative procedures. Between the two methods he considers the Elliot superior. In reply to the question whether the trephine operation should replace the Graefe iridectomy, Meller replies that the Elliot operation merely provides a more convenient, technically easier and less dangerous method of reaching the iris at its root. The attendant fistulization of the eye provides an additional remedial factor which is especially valuable in glaucoma simplex where the ordinary iridectomy is sufficient. M. W. J.

Retinal Hemorrhages in Miliary Tuberculosis.

STOCK (*Klin. Monatsbl. f. Augenheilk.*, January, 1914) found in vivo hemorrhages in the retinæ of a patient who died shortly afterwards of miliary tuberculosis. As a result of microscopic examination of these eyes, Stock concludes that these hemorrhages were the result of the action of angiotoxins derived from the tuberculosis bacillus. This case shows that hemorrhages in the retina during a severe infectious disease cannot always be regarded as evidence that the infection is one of pus organisms. M. W. J.

Choked Disc in Leucemia and Yellow Discoloration of the Background of the Eye Due to Lymphoma of the Choroid.

KAMBE (*Klin. Monatsbl. f. Augenheilk.*, January, 1914) attributes the choked disc to edema of the lymphatic spaces due to slower rate of the blood stream, a phenomenon which has been observed before in leucemia. The intensely yellow color of the eye grounds is due, Kambe believes, to engorgement of the choroid with lymphocytes. M. W. J.

Tumors of the Meibomian Glands.

SCHEERER (*Klin. Monatsbl. f. Augenheilk.*, January, 1914) reports a carcinoma of the lower lid arising in one of the Meibomian glands. M. W. J.

Keratomycosis Aspergillina With Formation of Conidiophores.

GRUTER (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) secured pure cultures of the aspergillus fumigatus from the cornea of a twenty-nine-year-old woman, who had evidently infected herself in handling mouldy straw. The infection yielded only after curetting the cornea, which remained badly scarred. M. W. J.

The Spontaneous Luxation of the Transparent Ectopic Lens Into the Anterior Chamber, Especially in Childhood, and the Operative Removal of Same.

AXENFELD (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) describes the handling of several cases of this type, and concludes that ectopic lenses (transparent) luxated into the anterior chamber should not be immediately extracted, but that one should consider carefully which treatment is least dangerous and safest. M. W. J.

Hypophysis Operations.

v. SZILY (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) concludes as follows:

1. The progressive reduction in vision and in size of the visual field toward the middle line or beyond same is in positively diagnosticated case of hypophysis tumor a strict indication for operative interference.
2. As the principal value of the operative interference lies in the possibility of saving the vision, the oculist usually calls attention to indications for operation. Improvement in technic now justifies advising operation.
3. Statements of the patient regarding improvement in vision after operation must be controlled by objective tests before and after same. Some of the improvement is frequently functional, owing to removal of depression and similar conditions.
4. Only a surgeon specially trained, or a rhinologist with the required knowledge of the operative procedure, should be called upon for the work, in order that every eventuality can be met. M. W. J.

Involvement of the Lacrimal Passages in Hereditary Lues.

IGERSHEIMER (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) asserts that affections of the tear passages in children between two and fourteen years of age are frequently traceable to hereditary lues, or at least affect people with that disease. Observation of a series of cases showed that hereditary lues was a factor in fifty per cent. On the contrary, acquired lues rarely causes involvement of the tear ducts. M. W. J.

Familiary Syphilis in Parenchymatous Keratitis.

BOAS AND RÖNNE (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) found that patients with parenchymatous keratitis frequently have apparently healthy brothers and sisters with a positive Wassermann. These should be traced, as preventive specific treatment is to be considered as necessary.

The inheriting of syphilitic infection is more irregular than is usually supposed. The birth of apparently healthy children is no guarantee that subsequent children may not be infected.

M. W. J.

Megalocornea or Hydrophthalmus.

KAYSER (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) investigated this question with the following results:

1. There is a pure megalocornea.
2. It is inheritable.
3. It can become congenital, according to the Horner-Bollinger type. Color blindness and familiary optic atrophy are the other two diseases which are of that type.
4. The most probable factor is consanguinity of the parents.

In addition, Pagenstecher has recently described as of the same type a form of retinal detachment which is accompanied by convergent strabismus and nystagmus. M. W. J.

The Importance of Fick's Contact Lenses in the Estimation of Binocular Vision by Means of Spectacle Lenses.

ERGGELET (*Klin. Monatsbl. f. Augenheilk.*, February, 1914). Prismatic deviation of rays with change in position of the eyes is especially apt to give rise to trouble in anisometropia. Erggelet believes that not the difference in the size of the retinal images, but the difference in the direction of the rays entering eyes, due to difference in lenses, is the main factor in explaining difficulty anisometropes have in wearing full corrections. The Fick lenses will help solve this problem.

M. W. J.

Why Cannot High Degree Anisometropes as a Rule Tolerate Their Full Correction?

ISHIHARA (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) rendered himself anisometropic by means of Fick contact lenses, and after a series of tests concludes as follows:

1. In fully corrected anisometropia a difference in the retinal images of both eyes could not be noticed.
2. In anisometropia of moderate degree, binocular vision is good so long as the patient looks through the center of the correcting lenses.

3. Muscular asthenopia develops as soon as the patient attempts to look through the periphery of the correcting lenses. These complaints do not arise in uncorrected anisometropia, and usually not in fully corrected isometropia.

4. The eye muscles can accustom themselves to move one eye to a greater degree than the other. This is shown by the fact that removal of the spectacles causes diplopia and the double images are fused with difficulty, but disappear promptly when the glasses are again placed in front of the eyes.

M. W. J.

A Peculiar Case of Enophthalmus Traumaticus.

WEIGELIN (*Klin. Monatsbl. f. Augenheilk.*, February, 1914). The eye was wedged into the posterior portion of the orbit through injury by the horn of a cow. Cornea could be seen, red reflex was elicited, and a year after the accident some of the retina was visible with the ophthalmoscope. The eye was of course amaurotic. M. W. J.

New Construction of a Stenopeic Spectacle.

WÖLFFLIN (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) devised a movable plate or ring which can be so adjusted on the black disc that a stenopeic opening can be brought to the desired spot by the patient himself. A flexible brass nosepiece is of service in adjusting the apparatus. M. W. J.

Muscle Bridle Suture for Fixation of Eyeball.

ELSCHNIG (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) recommends a suture through the superior rectus muscle as a means of fixing the eyeball during operations. M. W. J.

Tear Gland Extirpation According to Axenfeld.

PERLMANN (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) recommends the use of a small clamp, originally used in tracheotomy, to press the tear gland anteriorly so that it can be more easily extirpated. M. W. J.

An Electric Eye Warming Apparatus in an Aluminum Capsule.

EMANUEL (*Klin. Monatsbl. f. Augenheilk.*, February, 1914) has devised a light capsule-like apparatus, electrically heated, to be placed over moist dressing when hot compresses are indicated. M. W. J.

Nystagmus.

IGERSHEIMER (*Klin. Monatsbl. f. Augenheilk.*, March, April and May, 1915). After discussing the nystagmogenetic zones, Igersheimer reports concerning material which bears on the relationship between ear and eye. He produced a severe labyrinthine lesion by injection of a pure culture of spirochete into the blood. He was unable to determine positively whether patients having strabismus and nystagmus can trace same to an ear lesion. After examining ten patients with retinitis pigmentosa who also had nystagmus, he decided that the latter symptom was due to the eye and not to an ear condition. He reports finding no muscular reflex in the albino eye as had previously been announced by Elschnig. A series of patients with partial color blindness were recognized because of the nystagmus and photophobia first noted in such subjects.

Nystagmus in very young subjects, in whom there were no fundus findings or otherwise anything abnormal, were frequently congenitally luetic, and treatment caused a disappearance of the nystagmus. He also reports a case of hereditary nystagmus which followed the rule described by Debois—father to daughter, and mother to son. M. W. J.

Defects in the Visual Field of Hysteric Nature.

RÖNNE (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) warns against the influence of suggestion in taking fields. He advises changing the distance at which we examine while we maintain the same visual angle for the examining object. Rönne uses a ten millimeter object on the perimeter, and then controls this test with Bjerrum's curtain, using a sixty-seven millimeter object. M. W. J.

Orbitogenetic Brain Abscess and the Operating of Same.

ELSCHNIG (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) concludes that brain abscess following orbital suppuration is brought about by continuity through an ostitis, as is also probably the case in otogenetic abscess. He advocates draining this kind of brain abscess through the orbit rather than the brow or temporal region. By this method we avoid brain prolapse, a frequent sequela of the various trephine operations. Two cases of Elschnig and Schloffer showed no prolapse, at least no permanent prolapse, into the orbit when drainage was induced through this channel. In Elschnig's three cases of orbitogenetic brain abscess there was, at least at first, very little elevation of temperature but severe cerebral phenomena (headache and dizziness), and the differential diagnosis from meningitis could be made because of the absence of the general symptoms which accompany the latter, as well as the smallness in the temperature rise. Elschnig concludes that orbitogenetic brain abscess is localized in the frontal lobe, is easily reached per orbit, and is, therefore, in the domain of the oculist. Early diagnosis is essential to successful operation. M. W. J.

Real Carcinoma of the Retina.

ARISAWA (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) gives a detailed histologic report of this extremely rare condition. Whether primary or metastatic, could not be decided. M. W. J.

Pathologic-Anatomic Findings in Keratitis Parenchymatosa Syphilitica Congenita, With Special Reference to the New Formation of Connective Tissue on the Posterior Surface of the Cornea.

WATANABE (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) gives a detailed histologic report, and compares it with previous publications. He considers the connective tissue present the result of the inflammatory process in the corneal stroma which by contiguity replaced the endothelial cells with connective tissue. M. W. J.

Socalled Atrophia Gyrata Choroideæ et Retinæ.

KOMOTO (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) presents an illustration of this rather rarely described fundus picture. The parents were blood relations, hemeralopia existed from childhood, vision is poor and the visual field is contracted. There is high-grade myopia. M. W. J.

Bilateral Glioma Retinæ and Intraocular Ray Treatment.

AXENFELD (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) reports apparently holding a glioma retinæ in check for two months with Roentgen intensive raying plus exposure to mesothorium. The other eye had been removed because of a typical glioma. M. W. J.

Abderhalden Reaction in Disease of the Uvea.

Berneaud (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) concludes that the theory of Abderhalden applies to inflammatory conditions of the uvea, as has already been asserted by others. Particularly in uveal inflammations following perforating injuries and in isolated cases of hypopyon keratitis together with parenchymatous keratitis could positive results be elicited. Certainly there is no question of an organ specificity, and the demonstration of the presence of ferments in affections of the uvea has as yet no very practical value. Clinical methods enable us to diagnosticate uveal lesions more easily and quicker than by the reaction of Abderhalden.

M. W. J.

Corneal Transplantation With Unusual Course, Perhaps Following Anaphylactic Reaction.

Frieberg (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914). Six days after transplantation of a corneal flap which had remained clear, same became cloudy and the eyeball slightly inflamed. This was one day after removal of bandage and restoration of ocular movements. The symptoms again disappeared on rebandaging. Eight days later, after a period of quiet, the irritation again appeared. Frieberg believes we are dealing here with an anaphylactic reaction allied to those induced experimentally by Wessely, v. Szily and Arisawa.

M. W. J.

Tetany and Senile Cataract.

Fischer and Triebenstein (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) found positive evidence of latent tetany in sixty of sixty-eight cases of senile cataract. In twelve cases of corresponding age without lenticular opacity, ten were negative, one positive and one doubtful as regards tetany. From their investigations they believe that there is a close pathogenetic connection between tetany and senile cataract, and that every case of senile cataract should be examined by a neurologist and tetany ruled out before a diagnosis of simple senile cataract is made.

M. W. J.

The Clinical Diagnosis of Peripheral Anterior Synechia.

Hesse (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) suggests a method of illuminating the eyeball by means of an instrument somewhat similar to Sachs' lamp, to decide whether an anterior synechia is present or not, in order to decide on the type of operation to be done in glaucoma. As the light is moved towards the posterior chamber, if an anterior synechia is present the pupil will be illuminated before the ciliary region has been passed, as must be done in the normal eye where the borderline between anterior and posterior chamber is the ciliary body. In a normal eye the pupil becomes illuminated—i. e., red—only after the pencil of light has passed behind the ciliary body. By bringing the light into the equatorial region he was able to demonstrate not only a reddish pupil but a reddish ring one millimeter posterior to the limbus corneæ. This two and one-half millimeter wide ring was separated from the remainder of the posterior chamber by a darker area—i. e., that of the ciliary body. M. W. J.

Early Cataract in Atrophic Myotony.

Löhlein (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) reports these two conditions in a female of twenty-nine years. Lues, tuberculosis or other constitutional factors could apparently be ruled out. M. W. J.

Advancement of Conjunctiva in Cataract Extraction.

Constantinescu (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) loosens bulbar conjunctiva from upper half of cornea at the bulbus and undermines for one centimeter or more upwardly and to the sides. A suture on each side beginning below is passed through conjunctiva and subconjunctival tissue and then through the large flap above, slightly toward the median line. The sutures are now loosely tied. After extraction is completed one suture is tightened. A spatula is inserted beneath the conjunctival flap while the second suture is being tied. In this way the flap is advanced well over the upper part of the cornea. Constantinescu claims that danger of panophthalmitis will disappear if, in addition to careful attention to asepsis, this flap is used in cataract extraction.

M. W. J.

Influence of Dryness of the Air on the Origin of Spring Catarrh.

Bartels (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) discusses the influence of climate on this condition, and reports the results of observations made at an altitude of four thousand meters in Peru, where the air is extremely dry. This eye disease is very common there. That the air is a factor is suggested by the fact that the proliferations are most plentiful in the palpebral fissure portion of the bulbar conjunctiva. He suggested placing the patients in a moister climate, but has not yet had time to observe the effects of such treatment. M. W. J.

Treatment of Retinal Detachment.

Emanuel (*Klin. Monatsbl. f. Augenheilk.*, March-April, 1914) advises rest in bed, injections of tubercle bacillus emulsion, and attempts to influence the ablatio through change in position of the patient. He has tried these methods for as much as six months before advising operation. The operation of Birch-Hirschfeld, with the pressure bandage of Fehr, is advocated by Emanuel. He suggests aspiration of the subretinal space as a less radical procedure which should first be utilized. M. W. J.

Pathology and Therapy of Hypophysis Tumors.

Fleischer (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) reports on three cases which showed marked improvement in vision as well as general condition after operation—two by Schloffer's, one by Hirsch's method. A study of fifteen cases leads Fleischer to the following conclusions:

1. When once visual disturbances appear, blindness results in a few years.
2. In all cases hemianopic temporal defects appeared during the course of observation. These defects are partly due to increase in size of peripheral temporal contractions of the fields, and partly to blending of a contracting periphery with a gradually enlarging paracentral scotoma.
3. Whether the early injury of the crossing of the macular fibers is due to a direct injurious influence of the tumor as a result of the anatomic relations (Hypophysen gangtumor), cannot be decided until more autopsic material has been examined.
4. Operation should be advised on principle in every case of hypophysis tumor. Progressive failure of vision is an absolute indication for operation. M. W. J.

Hypophysis Tumors and Medical and Organ Therapy.

Wehrli (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) recommends that before proceeding to operative measures more conservative methods be given a trial. He has used hypophysis tablets (Merck) with small doses of potassium iodid in hypopituitarism. In one typical case brilliant results followed this form of therapy. He gave the tablets three times daily in the dosage of 0.1 gram, the potassium iodid in 0.5 gram three times a day.

He warns against giving this treatment in cases of hyperpituitarism as evidenced by the presence of acromegaly.

M. W. J.

Hypophyseal Disturbances.

Bartels (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) calls attention to the fact that certain genital anomalies, such as undescended testicle, have been noted by various observers in cases of hypophysis tumor. He suggests that the same congenital anomaly of the organism which gives rise to the formation of the hypophyseal tumor may be the cause of these abnormalities seen in the genitalia. Hypospadias and undeveloped penis were some of the other conditions noted.

M. W. J.

Abderhalden Reaction in Ophthalmology.

Franke (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) reports finding a definite positive sarcoma reaction in a patient who showed ophthalmoscopically a tumor which was diagnosticated a sarcoma of the choroid. Examination after enucleation showed a melanosarcoma of the choroid. A second examination several months after enucleation was negative.

M. W. J.

Localization of Angioid Pigment Streaks of the Retina.

Bayer (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) reports another case of angoid pigment streaks, and reiterates his former assertion that this condition does not belong to any of the other recognized retinal diseases. M. W. J.

A Case of Degeneratio Circinata Retinæ.

Ischreyt (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) reports that macular lesions could be differentiated from those found elsewhere in the fundus. The former show different stages of the process with thickening of the retina, as is evidenced by the envelopment of a vein by this tissue. The lesions outside of the macula occupy the deeper retinal layers and are nowhere following the arteries. On the other hand, no connection between these lesions and the veins could be made out. M. W. J.

Tumors of the Iris.

RAUBITSCHEK (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) describes in detail three tumors of the iris. The first consisted of an unpigmented part of the character of a spindle-cell sarcoma, resembling an endothelioma, with only a very few pigment cells, and of a tissue consisting of multiform richly pigmented elements. It was a connective tissue tumor, calling to mind in its unpigmented layers the endothelioma of the iris. Raubitschek does not put himself on record whether he considers this a tumor of mixed endothelioma and melanosarcoma tissue or whether we have here an illustration of Ribbert and Schieck's theory that the melanosarcoma develops from chromatophores by way of an intermediary unpigmented form. The second and third cases were granulation tumors in which all etiologic factors on investigation gave negative results.

M. W. J.

Metastatic Choroidal Carcinoma With Latent Primary Tumor.

ARISAWA (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) describes a scirrhus carcinoma of the choroid, a metastasis of a long latent rectal carcinoma. His conclusions are as follows:

1. A positively diagnosticated primary tumor of the choroid clinically, may be a metastasis of a latent carcinoma.
2. The metastasis in the eye arose by way of the posterior ciliary arteries, as in most other cases. In accord with this view is the position of the tumor in the macular region and the marked development of the connective tissue stroma in connection with the point of entrance of these arteries.
3. Histologically there is a marked resemblance to the other metastatic area in the liver.
4. There is marked contraction in the oldest portion of the tumor at the point of entrance of the arteries.
5. A socalled retinal strand is demonstrable in the subretinal space.

Imre some years ago asserted their origin from the pigment epithelium in connection with fibrinous clot. M. W. J.

Late Infection After Elliot Trepanation.

PAUL (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) advises that every effort should be made to provide an uninjured conjunctival covering for the wound, and that wherever simple iridectomy or some other operation will give the same result as the Elliot, the latter should be avoided. M. W. J.

Our Present Knowledge Regarding Double Perception.

HILBERT (*Klin. Monatsbl. f. Augenheilk.*, May, 1914). By this is meant the production of impressions on the nerves of more than one sense by the stimulus which ordinarily influences one sense organ only. In the past the following forms have been observed:

1. Color and form phenomena in sound perception (Schallphotismen).
2. Sound observance in light or color perception (Lichtphonismen).
3. Color and light phenomena in olfactory sensations (Geruchsphotismen).
4. Color and light phenomena in taste sensations (Geschmacksphotismen).
5. Color, light and form phenomena in pain, temperature and touch perception (Photismen der Hautensibilität), photismas of skin sensibility.
6. Color and light phenomena with vision of form (Formphotismen).

A photisma consists either of a tinted visual field or part of one, or a shaft of light or colored rays emanating from the object which gives the primary visual stimulus.

The few phonismas which have been observed consisted of a noise having an indefinite consonant note. The double perception is the more intense the less the individual pays attention to it, and the mode of onset is similar in all individuals. The phenomenon is more pronounced in childhood and is to a great degree hereditary. Psychopathic individuals are not any more prone to it than normal persons. The phenomena has been explained in a variety of ways by (1) von Bethe, (2) on Darwinian principles, (3) Steinbruegge, (4) Thorp.

He does not consider any of these theories sound, as a case reported by Lohmann could not be explained by any one of them. After discussing Urbantschitsch's work along this line he describes his own case.

A lady of excellent musical training saw people on foot or horseback in various costumes when listening to most musical renditions. The same individuals with the same surroundings appeared each time a certain selection was played. A voluminous and thorough bibliography is given. M. W. J.

Metastatic Scleral Abscess.

MEISNER (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) reports a case of staphylococcus abscess of the sclera which must have been of metastatic origin. The patient had a chill two days before the ocular symptoms appeared. The abscess was behind the limbus, which is explainable by the arrangement of the vessels in the sclera. There was a history of recent furunculosis as well as prostatitis following gonorrhea.

M. W. J.

Megalocornea.

HAAB (*Klin. Monatsbl. f. Augenheilk.*, May, 1914) recommends early operation of the cataract found in megalocornea because of the danger of luxation into the anterior chamber if same is already associated with tremulous iris. M. W. J.

Juvenile Periphlebitis Retinæ With Its After-Phenomena—A Real Vascular Tuberculosis of the Retina.

FLEISCHER (*Klin. Monatsbl. f. Augenheilk.*, June, 1914). In a man of thirty-six years, suffering with pulmonary phthisis, Fleischer observed a periphlebitis of the retina with accompanying hemorrhages. They healed gradually. A year later a retinal inflammation of hemorrhagic nature appeared in the other eye. This was associated with a fresh nodular iritis. A half year earlier a papillitis had been observed in this eye. Glaucoma came on in the course of the acute iritis, and an enucleation had to be done a year and a quarter after the initial examination. There was no questioning the assumption that the double sided periphlebitis retinæ with the sequelæ rested on a tuberculous basis. Histologic examination showed widespread tuberculous changes in the anterior portion of the bulbus, as well as similar phenomena throughout the veins of the retina. Fleischer believes that his findings prove that the retina is less rarely involved in the tuberculous process than was at first supposed. The involvement appears in a form which produces a clinical picture, because of the vascular relationships, which leave no doubt as to the tubercular nature of the disease. This was first stated positively by Axenfeld and Stock. M. W. J.

Anatomic Changes and Recession of Papillary Excavation in the Course of Glaucoma.

BEHR (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) states that the formation of a glaucomatous excavation in the anatomic sense does not necessarily mean the end of the process. The cavity may be completely filled in again. Behr differentiates between three types of this process. The first embraces eyes in which amaurosis has existed for a long time—eyes in which the visual function has been markedly affected and in which the fibers of the optic nerve have disappeared wholly or for the greatest part.

In this type an intensive proliferation of glia tissue from the bottom and sides of the excavation can occur with the development of countless vessels. These proliferations may not only fill out the glaucomatous excavation, but may bulge into the vitreous so that a choked disc may be simulated. We have here all characteristics of a gliosis. Same may be accompanied by inflammatory changes, as a result probably of the same factor which sets up the inflammatory glaucoma. Behr's investigations did not enable him to state what the cause of the glial proliferation really is.

The second group embraces those cases in which the greater part of the nerve fibers are still unaffected. Papillary tissue markedly infiltrated and showing inflammatory edema is found on the lamina cribrosa. It is probably an early stage of the type first described. In these two types the proliferation proceeds during the existence of high tension, whereas in the third type the tension has been brought to the normal through operation. In these cases the papilla does not as a rule reach its normal level again. M. W. J.

The Pallidin Reaction in Ophthalmology.

KLAUSNER (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) found the reaction positive only in lues gummosa, lues hereditaria tarda. Pallidin is the trade name of the watery extract devised by Fischer after Noguchi had presented luetin.

In one hundred cases suspected of lues, twenty gave a positive pallidin and sixteen a positive Wassermann. It seems to possess advantages over the Wassermann in interstitial keratitis. A negative pallidin, Klausner thinks, rules out lues gummosa or lues hereditaria. M. W. J.

The Appearance of Antitoxins in the Anterior Chamber.

POLEFF (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) found that antitoxin of diphtheria is present in the anterior chamber of actively immunized horses in amounts one to two hundred and fifty, nine hundred, as compared with the amounts in the serum. The amount of antitoxin (one-half to two I. U.) in the anterior chamber of the various horses was not equal. The amount of diphtheria antitoxin in the second aqueous (twenty-four hours after puncture of the anterior chamber) was greater than in the original. M. W. J.

Cataracta Dermatogenes.

ANDOGSKY (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) calls attention to the relationship between skin affections and lens opacities which may be classified as "Cataracta dermatogenes."

(a) The opacities develop in early life and up to around thirty years in individuals who previously had normal eyes and who are suffering with various inflammatory vascular or atrophic changes of the skin.

(b) The opacities are bilateral and begin their development in the epithelium of the anterior capsule as a rule. They have been noted in the posterior capsular wall, however.

(c) Entire lens becomes involved. Time of development from one week to three years.

(d) Are accompanied by no change, internally or externally, of the eye.

(e) Prognosis as regards result after operation is good.

M. W. J.

Difference in Pupils the Result of Monocular Scars of Cornea.

ZUR NEDDEN (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) calls attention to the fact that the pupil of an eye with a central macula of the cornea may become gradually enlarged while the other pupil remains unaffected. He noted it repeatedly and observed the development of the phenomenon in two cases through a period of several years. M. W. J.

Pathology of the Tear Sac and Ductus Nasolacrimalis in Roentgen Pictures.

v. Szily (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) photographed tear sacs and ducts with the Roentgen ray after injecting with a mixture of thorium oxidatum anhydricum (ThO_2) and acid free paraffin. He considers such pictures of value, especially when we are called upon to decide on a choice of operations for removal or drainage of the tear sac. M. W. J.

Actinomycosis of Cornea.

Löwenstein (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) reports three cases in people from the same neighborhood. All suffered injury from pieces of coal, and therapy was of no avail until cauterization was tried. M. W. J.

Observations on Kraupa's Work: "The Bacterial Prophylaxis of Operative Infection."

Ulbrich (*Klin. Monatsbl. f. Augenheilk.*, June, 1914) believes that when an eye shows no clinical evidence of inflammation, such as conjunctivitis or tear sac infection, and when a smear shows no pneumococci or large numbers of other bacteria, we may operate if the conjunctival sac is given a thorough irrigation under pressure before operation with some neutral solution, as normal saline, for example. M. W. J.

Experiments in Anaphylaxis With Chemically Pure Ocular Pigment (Cattle, Pig and Rabbit) With Pathologic and Anatomic Observations.

v. Szily (*Klin. Monatsbl. f. Augenheilk.*, Vol. LVI, January, 1916). These experiments are by the author of "Anaphylaxis in Ophthalmology," a subject in which he has been active for the last five years, a field in which he shares with Römer the leading place. Article does not lend itself to abstract; must be read in original. H. B.

Projectiles Remaining in the Orbit, Their Symptomatology, Prognosis and Treatment.

Plocher, R. (*Klin. Monatsbl. f. Augenheilk.*, Vol. LVI, January, 1916). The author, in an article especially well illustrated with Roentgen plate views, draws the following deductions from a study of fifteen cases at the Freiburg clinic: Good Roentgen pictures, as soon as possible, stereoscopically if possible. Many of these illustrations show the projectile deformed, and it is likely that a projectile remaining in the orbital cavity has hit its mark with low impetus, often having struck in its flight against the ground a stone, tree, etc. In seven cases muscular paralysis of the outer as well as of the ciliary muscle and sphincter pupillæ were the outstanding clinical features; in four cases exophthalmus; optic atrophy and choroidal rupture in two. It must, of course, not be forgotten that most of these injuries ended in exenterations, phthisis, etc., cases in which leading objective signs could not be differentiated. The muscular palsies and exophthalmus incline toward slow, more or less complete, recovery. The healed cases may months afterwards, however, show symptoms of accessory sinus disease, must be kept under observation, and the service of a rhinologist is indispensable. Primary infections are not frequent; later ones from the sinuses must be watched for. Eleven of fifteen cases were operated on, the projectile removed in eight. Three cases were treated conservatively; in six altogether then the projectile was allowed to remain and did so without further trouble. H. B.

Treatment of Tabetic Optic Atrophy.

Behr, Carl (*Klin. Monatsbl. f. Augenheilk.*, Vol. LVI, January, 1916), believes certain cases hopeful in this respect if the diagnosis be made very early. A diminution in the adaptation to darkness can be detected as one of the very earliest signs of tabes, and long before either the fields or the optic disc show any pathologic variation. This disturbance is the very first symptom of tabetic optic nerve atrophy. In a very carefully worked out paper he arrives at the following conclusions: In all tabetic nerve lesions, the more incipient the greater the result of treatment. Vigorous antiluetic treatment is indicated except in the following classes, in which it is absolutley contraindicated:

First, those with markedly diminished central visual acuity, early loss of color differentiation with at the time normal or nearly normal boundaries for white.

Second, marked concentric shrinking of the field, the white and color fields practically coincident in this process; normal or nearly normal vision.

Third, normal or nearly normal vision, photopsia and well pronounced atrophy. He believes to have found of benefit lumbar punctures, tapping ten cubic centimeters of fluid, once or twice a week during the course of antiluetic treatment; this he believes due to the increased activity of metabolic processes in the central nervous system, in the production of the removed fluid, and coincident with and because of this, a more rapid delivery to the affected parts of the curative agent.

H. B.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. Frederick, M. D.,

SAN FRANCISCO.

Jesse S. Wyler, M. D.,

CINCINNATI.

Treatment of Infectious Corneal Ulcers With Ethylhydrocuprein.

Darier (Traitement des ulcères infectieux de la cornée par l'éthylhydrocupreine, *La Clinique d'Opthal.,* January, 1916) published his conclusions two years ago, and now briefly mentions eight cases treated since the appearance of his first article with most favorable results. The author had many more cases, but his inability to devote sufficient time to the bacteriologic side because of the war has made these of no special importance. The report of Puscariu in the treatment of gonorrheal conjunctivitis is briefly mentioned. Axenfeld found zinc more advantageous in diplococcic infections, but uses optochin in pneumococcic conjunctivitis and dacryocystitis. Ramsey, Stengele, Schwartzkoff, Szolswieff, Morgenroth and Lystad are all quoted with a résumé of their findings. Darier's mode of procedure is to first stain the ulcer with fluorescein to discover its extent. A drop of cocain is instilled and the surface scraped with a fine platinum curette for the bacteriologic purpose alone. A scarcely visible particle of the powdered optochin is then placed upon the ulcer, this being followed by lacrimation and smarting. After a few minutes a little powdered dionin is applied for the lymphagogic action. Then for several hours a one per cent solution of ethylhydrocuprein is instilled half hourly, and before the eye is bandaged the following ointment is used: Optochin, 0.20; atropin, 0.10; vaselin, 10.0.

In very severe cases a subconjunctival injection of one per cent aqueous solution of optochin is used, also fifteen cubic centimeters of a polyvalent serum internally. Cauterization and Saemisch section are resorted to, according to indications and rapidity of spreading.

The entire article is an enthusiastic argument for the use of this valuable chemotherapeutic agent. J. S. W.

Experiments in Treatment With Pure or Combined Sera.

Lafont, Dupont, and Heckenroth (Essais de traitement par les sérums thérapeutique seuls ou associés, *La Clinique d'Opthal.*, January, 1916) attempted to treat the many cases of eye conditions occurring in the natives of Senegal, where they were stationed during the years 1913 to 1915. The very encouraging results, with their conclusions, are given in condensed form. In the pus were found diplococci, staphylococci, and pneumococci, Weeks and Morax, and evidences of protozoa, syphilis, tuberculosis, leprosy, etc. Forty-nine cases are tabulated with the varieties of sera used, antidiphtheritic being most frequently used. When this failed it was replaced by some other. The method of use was as follows: After a bacteriologic examination was made, the patient was given a wash of 1/5,000 to 10,000 oxycyanid of mercury to use for two days, after which six to seven cubic centimeters of any therapeutic serum was injected into the back. At the same time a few drops of this serum was instilled in the diseased eye, which was then covered with a tampon saturated with the same solution and closed for twenty-four hours. The following days instillations and moist dressings of the serum were continued. Without the subcutaneous injections the local treatment with serum was decidedly less effective. Quinin and arsenat of soda proved valuable adjuncts. Every variety of serum had to be used, including antiplague, antitetanic, etc., and one seemed to act as well as another. Fresh sera from the patient or from one of his nonsyphilitic friends proved ineffectual, and their use is not advisable. The results were so favorable that natives came from all over the colonies for treatment.

The histories of twenty-one cases are briefly related, to show exactly what conditions existed and what results were obtained. The conclusions state that these sera are the most wonderful means at our command to combat conjunctival and corneal lesions, and that all of Darier's findings are thus corroborated. The authors seem a trifle too optimistic, as the results of other investigations in the field have not been so fortunate. J. S. W.

Leucocytosis and Polynucleosis in Clinical Results.

Bérard (La leucocytose et la polynucléose en clinique, *La Clinique d'Opthal.*, January, 1916) gives a short résumé of the history and development of blood examinations for leucocytosis. He decides that if an increase in white corpuscles is nature's defense in infections, all of our therapy should tend toward creating this condition artificially. The lymphocytes are macrophagic, attacking dead tissue, while the polynuclear corpuscles are used in the destruction of microbic agents. Peptones, albumose, spermins, colloids, etc., have all been tried, with more or less success. However, the "Tapo" culture bequeathed by Prof. Masol of Geneva to his pupil and successor, M. Taponnier, provokes an abundant leucocytosis from the walls of the intestines, and in all cases in which it has been tried by the author gave a very rapid effect. Aside from the action of the intestines, this serum is most serviceable in superficial and deep suppurations. It is efficient in the bronchitides of tuberculosis, and the author, without intending to create the impression of a panacea, has relieved pain and improved the condition in two inoperable cases of sarcoma. J. S. W.

Observations of a Case of Infectious Orbital Phlegmon Cured by Paraspecific Treatment.

Dutoit (Observation d'un cas de phlegmon infectieux de l'orbite, guéri par le traitement paraspécifique. *La Clinique d'Opthal.*, January, 1916) remarks that experiments have proven the effectiveness of various specific sera in other conditions than those for which they were intended. The explanation is that when an antitoxin is injected into an animal not affected by disease, a defensive reaction is set up, antibodies, antiimmusines and bacteriolysins formed, and all the functionating structures participate in this defense. Thus a lymphocytosis is produced by the use of any paraspecific serum. For some time experiments have been made with a polyvalent preparation put on the market by a Geneva society; it is called novitase, and is used against all infectious diseases (pneumonia, influenza, urethritides, typhus, etc.), all from the same physiologic viewpoint. Dutoit wishes to put on record the first case of orbital cellulitis treated with novitase. Patient edematous, and discolored and marked exophthalmus. The conjunctiva was very chemotic, but cornea not affected; pupils reacted, and deeper parts of the eye perfectly normal. Eye very tender to palpation, and movement very limited. Constitutional symptoms were severe, with temperature of 40.2° C. A tablespoon of novitase was ordered hourly, even during the night, when patient was awake. Locally only two per cent boric acid compresses. The following day all the symptoms except the deep hemorrhages of the skin had disappeared. There was no more pain or tenderness, temperature 38.2° C. When the bottle of novitase was finished on the third day the result was practically perfect. All of which only verifies the observations of Darier, which he so judiciously termed paraspecific therapy, and which is only a more scientific method of an old practice for stimulating lymphocytosis and phagocytosis. J. S. W.

Concerning Ocular Injuries in the War.

Casimates (Des blessures oculaires de guerre, *La Clinique d'Opthal.*, January, 1916) describes injuries received during both Balkan wars and Dardanelles. Because of the trench warfare the eyes are much more frequently involved in the European conflict, and these are caused by hand grenades, shrapnel or bits of stone, never by Mauser bullets. In conservative handling of the less severe injuries no cases of sympathetic ophthalmia have arisen. He describes two cases of interest, without drawing any conclusions. The first, a Greek soldier, struck by a bullet, who developed a typical paralysis of the sympathetic of one side, with slow closure of upper lid, redness of conjunctiva and face, moderate miosis, etc., together with an amaurosis which subsequently proved to be purely hysteric. The second case was a French soldier who was rendered unconscious by the shock of a shell explosion, although not wounded. The vision was reduced to perception of light, but examination revealed only a discoloration of both optic discs, probably a double descending atrophy following a cerebral lesion from the force of the shell. J. S. W.

Concerning the Causes of Presbyopia and Cataract.

SCHANZ (Sur les causes de la presbyopie et de la cataract, *La Clinique d'Opthal.*, January, 1916) exposed lenses of rabbits and pigs at thirty centimeters to a quartz lamp for three hours, one receptacle being covered with quartz glass, the other with euphos, impermeable to the violet rays. The temperature never rose above 26° C. The lenses exposed to the chemical light showed the chemical changes of old age and cataract, those protected were not influenced. This, the author states, is proof that senile changes are due to the ultraviolet light in the spectrum. The action of the short rays is, firstly, by producing fluorescence of the lens, secondly by agitation of the epithelial fibers by being constantly thrown from the posterior concave surface to the anterior layers and back again. The cumulative action finally produces the changes which are seen in presbyopia and cataract. J. S. W.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D., OPH. D. (COLO.),

DENVER.

The Treatment of Strabismus.

MENDOZA, RAFAEL, Mexico (*Anales de Oftalmologia*, March-June, 1915), uses a simple contrivance for training binocular vision. A card thirty centimeters in width is held vertically between the two eyes and almost in contact with the nose, while the picture or page of reading is placed at one centimeter from the farthest side of the card. The patient tries to see the illustration or printed page as a whole. According to the respective parts played by the two eyes, the edge of the card away from the patient may be moved so as to increase or diminish the share of the picture or page seen by either eye.

Contribution to the Diagnosis of Multiple Ocular Paralyses.

MARQUEZ, M., Madrid (*Archivos de Oftalmologia*, December, 1915). Cases are described to illustrate the following pathologic conditions: (1) Isolated paralysis of one muscle of one eye, simulating a paralysis with manifestations in the other eye. (2) Paralysis of various muscles of one eye only. (3) Paralysis of the same muscle in each eye. (4) Paralysis of two or more different muscles distributed between the two eyes.

In the first case a paralysis of the right external rectus muscle of the left eye simulated a complex paralysis. There was a convergent strabismus of the right eye. The diplopia was found to be homonymous and to increase toward the left. Although the right eye turned in, it was capable of complete outward excursion. The left eye, on the other hand, could not be carried beyond the middle line toward the left. The condition was not, as might appear at first sight, a paralysis of the right external rectus, but a paralysis of the left external rectus with paradoxic deviation of the right eye. The turning of the right eye was apparently due to the fact that the vision of this eye was decidedly inferior to that of the left.

The second case was one of paralysis of the left superior oblique, superior rectus, and inferior rectus. There was diplopia, increasing downward and outward toward the left; homonymous in the lower visual field, but crossed in the upper visual field. Phorometer tests showed the anterior pole of the left eye to be deviated outward, upward and in external rotation.

The third case described was one of postdiphtheritic paralysis of both inferior obliques. The diplopia was homonymous and increased either above and to the right or above and to the left.

The fourth case was one of paralysis of the left inferior rectus and of the right superior oblique, of nuclear origin. There was homonymous diplopia, increasing downward and to the right, with the image lower on the left side.

Arsenobenzol ("606") and Affections of the Visual Apparatus.

GARCIA MANSILLA, SINFORIANO, Madrid (*Archivos de Oftalmologia*, December, 1915). Ten cases of syphilitic ocular recurrences after the use of salvarsan are described. There were three cases of iritis, two of gumma of the iris, one of gumma of the ciliary region, two of monocular optic neuritis, one of double optic neuritis, and one of double neuroretinitis and iritis. These disturbances occurred variously after the first, second or third injection of salvarsan, generally after the second. The date of occurrence varied between eight and forty days after the injection. The affections were in no respect due to toxicity of the drugs, but were manifestations of syphilis, which were cured with mercury, and could also have been treated with new doses of salvarsan, if the patients had not expressed themselves in opposition to this course.

Garcia Mansilla remarks that the occurrence of these syphilitic manifestations shows that the treatment with salvarsan has been insufficient, that in reality the patient was not cured of his syphilis, but not that the cause of these affections is "606."

ABSTRACTS FROM ITALIAN OPHTHALMIC LITERATURE.

BY

J. HERBERT CLAIBORNE, M. D.,

NEW YORK.

Cysts of the Cornea.

DOTT SPECIALE, CIRINCIONE (*R. Clinica Oculistica di Roma,* March and April, 1915) refers to the three kinds of cysts: The superficial, parenchymatous and deep. He describes as superficial cysts those cavities which are developed on leucomatous corneæ, and on the apex of pterygium, false or true. These cysts have but relative importance, because the way in which they are formed is well known. Folds of the conjunctiva emigrate from the pterygium, or corneal scars lose their communication with surrounding tissue and become converted into cysts. Such in reality are not cysts of the cornea, because the lamellæ are not involved. Hence they should be called spurious cysts. They are not infrequent. On the other hand, cysts of the cornea proper are quite rare. They are developed in the parenchyma of the cornea which was antecedently more or less sound, and not in corneæ covered by conjunctival folds or transformed cicatricial tissue. These are very rare. The author goes on to give the clinical history and microscopic examination of a superficial cyst and a parenchymatous one. After having described his own cases he cites the literature on the subject, giving the clinical history of cases cited in order to show the manner of formation of the cysts. The cases which he quotes are not very abundant, and it appears to the writer that he would have enriched his discourse and profited himself if he had studied the analysis of cysts made by Herbert Parsons. Likewise, he has failed to note a case reported by the writer in great detail, with suggestions as to the nomenclature in these cases, in the Transactions of the American Ophthalmological

Society; but the great value of the paper lies in the explanation of how these cysts are formed, and particularly in a good photograph of one of his own cases, together with beautifully colored illustrations of both cases, macroscopically and microscopically.

The writer feels constrained to again call the attention of the readers of the ANNALS to the excellent work and the beautiful microphotographs and drawings published in the *Clinica Oculistica.* J. H. C.

Researches on the Opsonic Power of the Aqueous Humor of Diabetes.

CALDERARO (*Clinica Oculistica,* University of Rome, March and April, 1915) has already referred to this subject in preceding reviews, and the conclusions herewith presented are the final ones drawn by the distinguished author:

1. In animals rendered diabetic by continuous injections of fluorin or adrenalin, even when there is complete removal of the pancreas, the alkalinity of the first and second aqueous humor remains unchanged, even when the urine shows an evidently acid reaction.
2. In fluorin glycosuria the glycose does not disappear in the aqueous, while it exists in adrenalin and pancreatin diabetes, where hyperglycemia is constant; in these cases the reaction for glycose is less evident in the newly formed aqueous, where it may even be lacking.
3. In experimental diabetes there is always a diminution of the opsonic power of the blood serum, and consequently also of the second aqueous humor, during the first twenty-four hours after paracentesis; but while this fact is developed quite early in adrenalin and pancreatin diabetes, and also when the nutrition of the animal has not yet fallen off, in fluorin glycosuria it is observed late, and only when the animal is profoundly depressed.
4. The opsonic power of the first aqueous of animals rendered diabetic does not differ from that of normal animals, or that of a physiologic solution of sodium chlorid.
5. In experimental diabetes with diminished opsonic power of the blood serum and newly formed aqueous, the subconjunctival injection of ten per cent sodium chlorid, and corneal infection from pyogenic bacteria, produce a slower and more

scanty passage of opsonins into the first aqueous than that which occurs in normal animals.

6. The diminution of the opsonic power of the aqueous in the cases cited is not dependent upon the abnormal amount of glycose in the aqueous, but rather upon the diminished opsonic power of the blood serum.

7. The greater gravity of corneal infections from pyogenic bacteria in animals rendered diabetic depends, above all things, upon the scant passage of opsonins into the aqueous and into the lymph spaces of the cornea.

8. The changes in the epithelium produced by injections of sodium chlorid into the anterior chamber facilitate the passage into the aqueous of glycose and opsonins circulating in the blood.

9. The diminished opsonic power of the blood serum and the aqueous in experimental diabetes can be raised by vaccines, after the manner of Wright. J. H. C.

Trepanning at the Sclerocorneal Margin—Clinical and Anatomic Researches.

Di Marzio (*R. Clinica Oculistica,* May and June, 1915). The surgical cure of glaucoma, after sixty years of discussion and clinical experiment, is still the subject of feverish research. In order to cure this disease, different regions of the eyeball have been chosen as the point of operative attack: but unfortunately, the number of attempts have tallied with the hopes of the operators. The lack of success met with, without a doubt, finds its cause in the lack of accurate knowledge of the etiology of glaucoma.

All the operative methods have been based upon the idea of making a breach in the external membranes of the eye and in keeping it open. The most recent is that of Elliot, which may be considered the epitome of all the operations suggested and practiced from 1830 up to this date. They have all been done upon the sclera and have raised hopes that cannot be realized. The method of Elliot has for its basic idea the removal of a small disc of tissue at the sclerocorneal margin, an appropriate trepann being used. Before him, Robertson, Blanco and Frölich had attempted trepanning the equator of the globe, but the results were not favorable, and the gravity of the injury done that region did not justify the proceedings.

After describing the original technic of the Elliot method the author described likewise Elliot's modified operation, and his own operation, which he divides into six parts. The article is accompanied by numerous photographs and drawings of the pathologic results, together with a study of eleven cases operated on by his method. His method consists largely in the same steps that constitute the Elliot method, but the button removed is further in the cornea, its upper edge just touching the sclerocorneal margin, so that the button consists almost entirely of corneal tissue. Likewise, the peripheral iridectomy is larger, the conjunctival flap being about the same. He finishes his article in the following way:

1. To make a conjunctival flap so as to expose a zone of cornea of about two millimeters.
2. To make the trepann in the transparent cornea thus exposed (that is, in the peripheric lamellæ) so as to be sure to avoid the ciliary body.
3. To adjust the trepann at the one millimeter stop.
4. To make an ample iridectomy in every case.

J. H. C.

Lesion at the Macula From Traumatism Discovered Four Years Afterward.

Scimemi, E. (*Clinica Oculistica,* July and August, 1915), reports this case of injury to the macula because the lesion was first discovered four years after the accident, and because of the medicolegal value of the case.

A workman of fifty years, while digging with a pick, was struck in the right eye by a piece of wood which flew up from a stroke of the pick. There were two corneal wounds, small and unimportant, which healed in several days, but the sight diminished considerably. There was no cause visible in the background of the eye to explain the lowered vision, nor was the latter benefited to any appreciable extent by refractive correction. Repeated observation by three distinguished oculists for two years and a half failed to discover anything but slight pallor of the disc, with moderate restriction of the field of vision. The patient was dismissed, but four years after the injury a further loss of vision, which was reduced to 1/50, induced the patient to return. There were but slight changes on the disc at this time. The color of the fundus was red and finely granular uniformly almost to the equator, and the choroidal vessels could not be seen at any point. There was a slight cloud along the superior artery. The arteries in general were very small and hardly visible at certain points. The region of the macula was slightly dark, with badly defined margins such as is met in adults; on the other hand, it was a little lighter than the rest of the fundus, and showed in its immediate vicinity small spots and streaks of yellowish gray color, with a slightly rosy tint. Here and there pigment granules, particularly in the upper region. Nowhere could the vessels of the choroid be seen, nor was there any sign of cicatricial striæ or newly formed tissue. The field of vision for white was uniformly contracted, but it was not possible to determine that for colors, because in the periphery they were not recognized with certainty. The author refers to the observations of a number of writers apropos of this subject, and touches upon the socalled retinal shock with edema of the macula, which frequently accompanies it. Likewise he refers to the frequency of macular changes after contusions of the globe; of one hundred and ninety-two cases of contusion of the globe, Siegfried found the macula affected in forty-six, and he concludes with the opinion that the choroid in general is the seat of the most notable changes after contusion of the globe; these range from very small lacerations to hemorrhage into the substance of this coat. He thinks this case demonstrates that an oculist should be very cautious in prognosis in traumatism from contusion, even when the ophthalmoscopic examination at first does not reveal any appreciable change.

J. H. C.

Trepanning at Sclerocorneal Margin.

Di Marzio (*Clinica Oculistica,* July and August, 1915). This paper is the finale of a preceding paper on this subject, and after the minute study clinically and histologically of thirty-four cases, the author draws, in substance, the following conclusions:

First—Sclerocorneal trepanning for the cure of glaucoma is an operation of easy technic, and can be repeated a number of times on the same globe at no great intervals. But it is indispensable that the scleral body should be respected; likewise that there should be a stop put on the trephine in order to limit its action.

Second—The complications to which trepanning may give rise are of no great importance, as, for example, hemorrhage into the anterior chamber, slight iritis and incarceration of the iris, when the excessive fragility of this tissue does not permit of an iridectomy.

Third—The curative power of this operation lasts until the loss of substance is substituted by dense scar tissue, and then not more than three months.

Fourth—The form and the appearance of the scar which fills the aperture has only a relative value, inasmuch as they change with the different phases of the scar process; the last phase is that in which the scar becomes compact, or more compact than the surrounding tissue.

Five—If an iridectomy has been done before the trepanning, as is our custom, the result of the operation is better and it lasts longer. A definite cure can be obtained only by doing an ample iridectomy along with the trepanning.

Sixth—Trepanning the cornea at a tangent to the limbus can be done in any glacomatous eye whatever, even in those in which the narrowness of the anterior chamber renders any other operation difficult.

Seventh—This operation is particularly useful in absolute glaucoma, since it permits the conservation of the globe, which would otherwise be destined to enucleation; likewise in hemorrhagic glaucoma.

Eighth—This operation should yield to the classic iridectomy when the conditions favorable for performing the latter exist. J. H. C.

The Presence of Tirosin in the Choroid—Biochemic Researches.

CIRINCIONE (*Clinica Oculistica,* July and August, 1915). The presence of iron in the molecule of many melanins raises the question whether such melanins should be considered as products of the transformation of hemaglobin, or as derivatives of protoplastic substances originally colorless, brought forth by metabolic cellular activity.

Nencky has found a certain likeness between the minute composition of proteid chromogen which is obtained as the product of albumin in the pancreatic digestion and the composition of animal pigments. Nencky thinks, therefore, that in albumin there is contained a choromogen group which serves as the mother for the formation of blood and other pigments. After referring to chemical experiments with the choroids of the eyes of oxen, he considers it possible to affirm that in such choroids there is a ferment more or less of the nature of tirosin; that this is the first time, as far as he knows, that the presence of a ferment of this kind has been demonstrated in any normally pigmented organ in mammiferous animals, and that this fact renders it still more probable that natural melanins have their origin in the products of the albuminoid elements of cellular protoplasm and are occasioned by ferments of the type of tirosin. J. H. C.

Contribution to the Study of Pemphigus of the Conjunctiva.

CIRINCIONE (*Clinica Oculistica*, September and October, 1915). No doubt exists today that pemphigus of the skin and that of the conjunctiva are of the same nature. In each, bullæ are formed of different sizes which, on breaking, leave a loss of substance, the spot being at times red and easily bleeding, at others gray and croupous, and in all cases the process ends in dense scar tissue. The blebs have a different look in the skin and in the conjunctiva. In the former they are composed of epithelium and are tough; in the conjunctiva, on the other hand, the epithelium is very delicate and soft. Microscopically the beginning of pemphigus of the conjunctiva is marked by the diminution and lessening of certain elements of the epithelium of the conjunctiva; the existence of a great quantity of polynuclear cells, scattered lymphocytes, many eosinophile cells and a few epithelial cells. In the conjunctiva, after the bleb has burst, three facts are observed which explain the clinical course the disease takes: First, diffuse infiltration of the subconjunctiva. Second, cicatrization of the tarsoconjunctival fold. Third, adherence of the lid to the anterior surface of the globe.

Following this there is a beautiful drawing of the microscopic appearances of the lid after pemphigus. The author then refers to the numerous bacteria which have been found in pemphigus by a variety of observers; describes four clinical cases, which he had studied with the conclusions as to his bacteriologic findings in them. The diplococcus found by him in these cases is different from that of Fränkel, but has many marks in common with it, including virulence; it is certainly a germ of the same family as the coccus of Fränkel; in the conjunctival bleb and in the conjunctiva, when the pemphigus is developing, this diplococcus is met in pure culture or in great quantity; when the conjunctiva is totally cicatrized and the cornea opaque—that is to say, when the process in the eye has entirely ceased—the diplococcus is no longer found. From these facts he would conclude that this is the germ of pemphigus in the cases observed by him; but the biologic proof is lacking, which is the most important, and therefore he limits his conclusion to the statement that the conjunctival changes in pemphigus were accompanied in his cases by a diplococcus similar to that of Fränkel. J. H. C.

SOCIETY PROCEEDINGS.

BY

ARTHUR J. BEDELL, M. D.,

ALBANY.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Regular meeting, held December 20, 1915. Dr. Richard J. Tivnen, the president, in the chair.

A Peculiar Corneal Condition.

Dr. J. A. Pratt, Aurora, Illinois, reported the case of Mr. H., first seen October 12th, giving a history of having been struck in the eye with a piece of cornstalk last April. The eye became red, sensitive to light, with scalding tears, but no other discharge. These acute symptoms lasted for two weeks and then subsided.

At different times, until August 24th, the eye would smart and tear. On that date the patient consulted a physician, who found that the vision in each eye was 20/80, and with correction, 20/20. On illuminating the pupil a well defined spot about the size of the diameter of a pin could be seen in the center of the pupil of the right eye.

September 25th he returned with all the appearances of a well marked ulcer of the cornea, including a slight hypopyon and a slight deposit on Descemet's membrane. The central part of the ulcer or deposit in the cornea was not broken down as much as one would expect it to be, judging from appearances, inflammatory symptoms and purulent secretion present. The central portion of the surface was cauterized with carbolic acid, and it was immediately observed that the surface was only partly broken down, since the size of the deposit was about the size of a medium pupil, while the depression was about the size of a pinhead.

Under six days' local and general treatment the ulceration and hypopyon disappeared. As the inflammatory symptoms continued, atropin, one per cent, was used, with no result; but with the crystal of atropin the pupil dilated completely and was easily maintained. The spot in the cornea remained, and in two weeks changed its shape from an oblong with long diameter perpendicular to an oval with the long diameter in a horizontal direction, without any change in the inflammatory symptoms.

When the patient consulted Dr. Pratt the second day after leaving Dr. L., there was intense pain around the right eye; the iris was adherent to the lens in the position in which it was now found, which was about the size of a normal pupil. A little below the center of the pupil was a well defined deposit in the anterior third of the cornea, about two by one millimeter, with the axis perpendicular, and looking very much like a corneal abscess. It was cut down upon and found to be a yellowish white tissue. There was hardly any haziness of the cornea around it. There was lacrimation and photophobia, and intense pain at night which was due to the iritis present, and which subsided after using atropin (two per cent) at home every four hours, and atropin and dionin powder once a day at the office. Under this active treatment the iris still remains fixed. The patient states that for one week of the time he was with Dr. L. he did not go to bed on account of the intense pain.

November 22nd the patient was taken to the National Pathological Laboratory in Chicago, and the cornea was opened and the tissue scraped, but the findings and Wassermann were negative.

The deposit has now assumed a pear shape with a diameter of two millimeters each way, so that it is gradually enlarging. The cornea is also becoming hazy around the deposit. The inflammatory symptoms are mild and the patient sleeps well at night.

Dr. Pratt brought the case before the society for advice and diagnosis.

Discussion.—Dr. Oliver Tydings recalled having a case many years ago of primary melanosarcoma of the cornea in which the iris was invaginated. In the case reported by Dr. Pratt he understood there was no wound. The corneal tissue is not prone to malignancy, and personally he would continue the treatment the doctor had been giving—namely, atropin, dionin and heat—to see if the case did not improve.

Dr. George F. Suker asked what the microscopic findings showed.

Dr. Pratt replied that they were absolutely negative. New tissue had taken the place of corneal tissue. It was increasing in size, and the haziness of the cornea and around it is becoming greater, although the man sees better because the iris is drawing away in the upper part.

Tuberculosis of the Eye, With Special Reference to Treatment.

Dr. W. E. Gamble stated that the general surgeon's routine practice of a decade ago, of removing tuberculous tissue wherever found possible (joints and glands), has given place to a more conservative treament, owing to the fear of general dissemination of the disease. Ophthalmologists have learned that operations involving the inside of the eye, as iridectomy, to remove tuberculous foci in the iris, are not only dangerous to the eye, but to the life of the patient. Von Hippel would only undertake extraction of secondary cataract when the tuberculous eye has been free from irritation for two years. In the presence of glaucomatous increase of tension, if the use of myotics does not suffice, he considers Elliot's trephining less dangerous than iridectomy, as being an operation of less magnitude and not so likely to occasion scattering of the bacilli.

In the diagnosis of tuberculosis of the eye the ability of the ophthalmologist to see the pathologic changes makes the diagnosis much easier than in other parts of the body. The clinical picture is often all that is necessary to make this complete, as tubercles in the choroid or nodules in the iris; yet there were occasionally obscure cases the nature of which we are unable to make out with the ophthalmoscope aided by the history of the patient.

In the early days of the use of tuberculin, most ophthalmologists saw untoward results from the diagnostic dose. The author saw a patient put to bed for several days from its use (four milligrams O. T.), and indeed several weeks passed before patient fully recovered. If these transitory symptoms were the only harm produced by this reaction, we would not be disturbed by the fear of its use; but there is accumulating evidence that these pronounced reactions are liable to cause general dissemination of the bacilli. This danger is greater in cases with tuberculous cavities and large tuberculous areas in the organism outside of the eye.

The focal reaction can best be studied in tuberculosis of the iris, and consists in hyperemia of the blood vessel about the tubercular nodules, and ciliary injection, especially in the region of the involved area.

Tuberculous foci of a chronic type occur in the sheaths of the nerve also, and may be manifested in the eye in three forms: as a neuroretinitis not unlike albuminuric neuroretinitis, as an optic neuritis, and as a retrobulbar neuritis.

The acuity of vision of the affected eye in optic neuritis, or neuroretinitis of suspected tuberculous origin, may aid in differentiating between involvement of the sheath of the nerve and of the septa in the nerve itself. In the former the reduction will not be great. In the writer's cases the vision was 20/20, in the other 20/40, while in the latter the reduction would be greater. The field of vision may be not only a means of determining whether the foci are in the sheath or in the nerve itself, but may also aid in locating the anatomic portion involved.

Tuberculosis of the eye may exist without focal reaction being produced by tuberculin, even in doses of ten milligrams. Von Hippel enucleated an eye full of tuberculous masses, yet a general reaction to old tuberculin was only obtained at the sixth injection of five milligrams. Derby remarked that in a very considerable number of cases the desired reaction does not occur. This is in accordance with the experience of the writer.

The knowledge that by well regulated diet, clean air and rest a general resistance to the tuberculous process may be acquired has given the profession the most potent weapon in the fight against this disease. General resistance comes slowly after weeks and months of treatment. In tuberculosis of the eye much harm and often destruction of this organ results before this is acquired. Fortunately we possess in tuberculin a means of inhibiting the progress of the disease and curing it in many cases.

Among seventy-five cases of tuberculosis of the iris and ciliary body relapses occurred in fifteen, and at intervals of from three months to three years after the end of the first course of treatment. In one hundred and fifteen cases of tuberculosis of the cornea there were twelve relapses. In eighteen cases of keratoiritis, three; in eight cases of conjunctivitis there were two relapses. There were no relapses in cases of the sclera or choroid. The total number of relapses was thirty-two out of two hundred and forty-three patients. A long interval must elapse before one is justified in considering tuberculosis of the eye definitely cured.

Tuberculin in large doses produces a definite action upon the tuberculous area. Cumulative evidence seems to point to the fact that this is, at most, only of secondary therapeutic importance, but that the important curative effect lies in establishing an active immunity against the disease.

Discussion.—Dr. William H. Wilder said the essayist had wisely called attention to the danger that might result from the diagnostic use of tuberculin, for all had seen instances where tuberculin had been used indiscreetly. It would seem, however, if certain precautions were observed, the danger might be comparatively insignificant. Too frequently the observer, thinking the case to be one of tuberculosis of the eye, resorts to the diagnostic use of tuberculin without first having made a careful physical examination of the patient. Such an examination should be complete enough to exclude other possible causes of inflammation of the eye, such as foci of infection in teeth, tonsils, prostate, etc.

It stands to reason that there will be great danger in the use of diagnostic doses of tuberculin if the patient has an actual cavity in the lungs or shows an active tuberculous process in the joints or vertebræ or elsewhere. Such possibilities should be borne in mind. Furthermore, it is indiscreet to administer diagnostic doses of tuberculin without having a normal temperature record for several days preceding the use of the first dose.

He thinks that if such precautions are observed there will be fewer accidents to record, and fewer cases in which the eye trouble is aggravated.

Again, there are certain conditions in the eye that may be recognized clinically as tuberculous in which it may not be necessary to administer the diagnostic dose of tuberculin, except possibly as confirmatory of one's suspicions. Such are certain choroidal conditions, certain conditions of the cornea and sclera like sclerosing keratitis, keratoscleritis and inflammation of the iris in which tuberculous masses may be actually seen.

Unfortunately for our diagnosis these well defined clinical cases are not as numerous as the more obscure ones in which we desire to get the help that comes from the diagnostic test with tuberculin.

As to the administration of the diagnostic dose of tuberculin after the patient has been prepared for it by a careful physical examination and a few days' test of the body temperature, he thinks in the very large majority of cases we are safe in administering one-half milligram of old tuberculin. Koch himself advised the use of one milligram as the initial dose.

If this produces no general nor local reaction and no rise in temperature, it should be followed in twenty-four or forty-eight hours with a dose of three milligrams. If this produces no general or local reaction or rise of temperature, a final dose of five milligrams may be given in twenty-four hours, and if no reaction follows, the assumption is that no active focus of tuberculosis is present. If, however, there is a distinct reaction at the point of puncture, the evidences of local or general reaction should be looked for very carefully, and a rise of temperature of one degree or even less may be very suggestive, so that the next dose, if one is given, should be smaller than originally planned.

If a local reaction occurs in the eye with the suspected lesion it will manifest itself by ciliary injection, or an increase of it if ciliary injection was already present. Unfortunately in many cases where this test is made the eye is already so inflamed that it is difficult to detect the difference in the redness that might be caused by the local reaction, and hence the value of the test is more or less problematic, and we must reason from the general reaction that the eye lesion is probably tuberculous. The previous exclusion of an active tuberculous lesion by physical examination is, therefore, of great value.

One important point to remember in connection with the tuberculin test is the possibility of anaphylaxis. If one waits for a considerable time between the initial and the second dose the patient may show an anaphylactic reaction. For this reason it is wise to proceed within forty-eight hours, if necessary, with the administration of the second dose, and then within twenty-four or thirty-six hours the third dose, to avoid the danger of anaphylaxis.

Dr. George F. Suker said, in reference to certain forms of parenchymatous or phlyctenular keratitis and nodular or phlyctenular conjunctivitis of low grade in which the physical findings are not marked, no diagnosis of tuberculosis should be made without a complete physical examination, this to include a skiagram of the chest. He has on many occasions had chest skiagrams made of children and young adults in whom there was but a faint suspicion of tuberculosis, and found enlarged peribronchial glands. When such patients were subjected to the tuberculin test, they usually gave a marked reaction and many times locally. And under the tuberculin treatment these cases made a good recovery. We should resort to the diagnostic tuberculin reaction test only at the very last—only when all other aids for a diagnosis of tuberculosis fail.

These low grade tuberculous inflammations of the conjunctiva and cornea do not always show the tubercle bacillus, but are the result of the toxic agent of tuberculosis engendered somewhere in the body. In the absence of the bacillus in the eye lesion, the tuberculin test does not always give a local reaction.

In reference to the therapeutic dose of tuberculin in the treatment of these cases, he believes in giving small doses and only increasing same when no temperature reaction follows the injection. The interval between injections must not be too short—usually one injection a week is sufficient in conjunction with the other measures employed.

Dr. E. K. Findlay saw the cases of tuberculous optic neuritis referred to by Dr. Gamble, and was deeply impressed with the result of the tuberculin treatment. His attention was called to the pronounced reduction of sight that followed a large dose of tuberculin in the case of optic neuritis. Since that time the speaker has never found any focal reaction in a number of cases in which he has given tuberculin. He was pleased that the essayist had given definite directions regarding the size of the diagnostic dose, as there was so much confusion on that point. The remarks regarding standardizing the various preparations on the market deserve consideration, as the inert preparations may account for many of the discouraging results that have followed this method of treatment.

Dr. L. W. Dean, of Iowa City, Iowa, said that whenever it is necessary to make tuberculin tests it is quite essential to have made first a thorough systemic examination. All of his patients needing tuberculin tests are taken as house cases, whether they are private or clinic patients, and kept in the hospital for three or four days.

Previous to the tuberculin tests a complete systemic examination is made by a competent internist. This obviates the danger of a serious reaction because of gross pulmonary or other tubercular lesion. His procedure with this class of cases is as follows: First, the sinuses, nose and throat are carefully examined, then the teeth are looked after by a dentist. The patient is then placed in the hands of the internist and examined by him before the tuberculin test is applied, the internist determining whether it is safe to make the tuberculin test or not. With the completion of the general examination the patient has a second careful examination of the eyes, and if advisable the tuberculin tests are applied.

In many cases it is necessary to have a careful examination of the prostate, bladder and kidney.

In a number of cases the cause of the trouble has been located by the genitourinary specialist. Unfortunately, even with clinic patients in Iowa, it is difficult to get a very complete cystoscopic examination made because of objections on the part of the patient. Some of our patients have even refused treatment before they would undergo this examination.

Doctor Dean mentioned several instances where in the presence of positive Wassermann reactions with positive tuberculin reactions the patient has only done well with the use of the tuberculin therapy.

Dr. Oliver Tydings expressed himself as being fully in accord with Dr. Dean in insisting on making a more thorough examination of everything possible. It is necessary to make these investigations, particularly with regard to the condition of the sinuses and teeth and the intestinal tract, in cases of luetic infection.

With regard to some of the manifestations of tuberculosis of endogenous origin, such as phlyctenules and scleritis, and conditions within the globe producing retinitis proliferans, etc., due to endotoxins, he is fully in harmony with Dr. Wilder along that line.

As to the use of tuberculin in the various conditions, since the introduction of tuberculin in this country he has used it extensively. He has heard the warning of physicians in cases in which it can, and in cases in which it should not, be used; that it must not be used in fevers or in hemorrhagic conditions, and great care must be exercised in using it; nevertheless, he has used it in hemorrhagic conditions of the lung; he has used it in fevers and in similar conditions, and he does not know of any condition which is due to a tubercular process in which the judicious use of tuberculin is not beneficial, for he has never seen any ill result from such use.

He has had two cases of anaphylaxis following the use of tuberculin, but these occurred in days when very little was known in connection with its use. These two cases occurred within forty-eight hours of one another. Both of them were alarming for a time, and were the only two cases he has seen.

Dr. Michael Goldenburg related his experience experimentally with tuberculin five or six years ago, when phlyctenular disease was thought to be due to tuberculosis. He used then the von Pirquet reaction, and got a positive reaction in nearly every case, and concluded then that he could get that sort of reaction with other microorganisms made by the same process, such as the colon bacillus and staphylococcus. He made two von Pirquets and one colon vaccination, and the peculiar thing was he only had a reaction from the tuberculin and no reaction in the other. He did the same thing with the staphylococcus and got the same results. He then consulted a number of bacteriologists in Chicago, who thought probably he did not use the proper organism; that he should use an organism that has an intracellular secretion, and suggested the use of the Klebs-Loeffler bacillus or the streptococcus. So he had this made up by the same process. He used these organisms in a great number of cases and did not get a reaction in any of them, but did get a reaction with the tuberculin.

While he is inclined to think that the von Pirquet reaction is of value, yet at the present we are unable to interpret the picture presented with any degree of value from a practical standpoint. According to some authorities, Wolf Eisner and others, who on several occasions dissected out these tissues, a typical tubercle, tubercular caseation, giant cells and surrounding infiltration has been found.

Dr. Richard J. Tivnen reiterated the remarks of Dr. Tydings relative to tuberculin, which is a very potent agent. He agreed with Dr. Dean that the patient should undergo a complete physical examination before subjecting him to the diagnostic dose of tuberculin and subsequent therapeutic treatment.

So far as the reactions are concerned, local and focal, general or constitutional, he has not had very many focal reactions. He had occasion to study a series of phlyctenular cases five years ago, and he then used the von Pirquet test, and like Dr. Goldenburg he had obtained a large number of positive responses to this test, but only a very small number of focal reactions.

In his judgment phlyctenular disease is a tubercular process. The syndrome these cases present is classical of the tubercular process. The crux about phlyctenules which causes trouble is their recurrence, and he thinks tuberculin is as useful in controlling these recurrences as any agent at our command. If he were asked what was the most important agent in the treatment of tuberculosis, not only in the eye, but in general work, he should put at the head of the list tuberculin. However, in the use of tuberculin the greatest care should be exercised, particularly with reference to the variations in the temperature curve, both before administering the diagnostic dose and during the therapeutic course of treatment. As to the dose itself, it is safer to banish the notion of there being a definite dose and rather individualize. Great wisdom should be shown in the selection of cases. The product is extremely important. He has used mostly the Lucius and Brunning product, which is quite generally employed. He had enjoyed Dr. Gamble's instructive and scientific paper very much indeed.

Dr. Gamble (in closing the discussion) said that the danger of dissemination of tubercle bacilli from the use of tuberculin is causing a reaction against its use in phthisis pulmonalis and in tuberculous cavities in other parts of the body. Diagnostic doses cause an increase of tuberculous areas in the lungs, as shown by radiograms taken before and after subcutaneous injection. Tubercle bacilli are seen in the sputum after injection when not found before. It is in small isolated foci, as in the eye, that this treatment is of undoubted value and has come to stay.

Wehrli a few years ago demonstrated that the appearance of tubercle bacilli in chronic tuberculosis varies from that of the acute type. He spoke of them having a granular appearance—that is, some defect or variation in paths and capsule. He devised a different stain by which he could identify them.

The author has never had anaphylactic symptoms from the use of tuberculin.

Intracapsular Cataracts.

Dr. William A. Fisher reported three cases on which he had operated for cataract by the intracapsular method, in order to let the members observe the condition of the eyes after the operation and note the visual results.

These patients were operated upon October 7th before the members of the Academy of Ophthalmology and Otolaryngology at their annual meeting. An iridectomy was made at the time of the operation in each case, without introducing the iris forceps into the anterior chamber—the Smith method. The three extractions were performed without accident or complication. There was no pain or postoperative inflammation in any of them, and the bandages were not disturbed for nine days. At the end of the ninth day the bandages were removed, the anterior chambers were reformed, the corneal wounds were closed, there was no iris prolapse in either of them, and the only treatment they received after the bandages were omitted was to keep the eyes clean and wear smoked glasses. They all counted fingers at about five feet when the bandages were removed. Their total time in the hospital after operation was fifty-eight days, an average of nineteen days.

The histories of these three cases are as follows:

Case 1.—Mr. D., aged seventy-four years. Mature cataract right eye. Referred by his brother, Dr. Davey, Chicago. October 7th, intracapsular operation; left hospital October 21st with vision 20/30 with pinhole. Referred him to Dr. Pendleton, Quincy, Illinois, where he lives, to be refracted. A letter from Dr. Pendleton, November 25, 1915, says that Mr. D. has vision 20/20 with plus 10.00, and that the ophthalmometer does not show any astigmatism.

Case 2.—Mrs. E., aged seventy years. Mature cataract.

Referred by Dr. Mundt, Chicago. October 7th, intracapsular cataract operation. Patient left hospital October 29, 1915. December 20, 1915, her vision is 20/20 with plus 11.00 combined with plus 2.00, axis 30°.

He was unable to present this patient to the society on account of her age, and because the society meets at night.

Case 3.—This patient was presented for inspection. Miss W., aged fifty-five years. Mature cataract of right eye. Referred by Dr. Tydings, Chicago. October 7th, intracapsular cataract operation. Patient left hospital October 29th. December 20, 1915, her vision with plus 10.00 is 20/20.

Repigmentation of an Inflammatorily Depigmented Iris.

Dr. Harry S. Gradle reported the case of a patient, forty-five years old, who had his first attack of iritis in the left eye in 1907. Five years later a second attack occurred. In October, 1915, patient suffered a third attack, during the course of which the left iris became depigmented, changing from its former brown to a perfect blue color. The inflammation subsided rapidly after exenteration of his hyperplastic ethmoids, leaving a blue iris with incomplete posterior annular synechiæ. Within three weeks after the inflammation disappeared, brown pigment granules, identified under the corneal microscope as chromatophores, began to make their appearance at the periphery of the iris, eventually forming a solid brown ring around an otherwise blue iris. This ring is gradually advancing toward the pupillary edge, while the remaining iris stroma is studded with individual chromatophores.

PAUL GUILFORD,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Regular meeting held at Colorado Springs, January 15, 1916. Dr. E. R. Neeper presiding.

Diabetic Retinitis.

Dr. E. R. Neeper presented M. V., aged twenty years. First seen September 24, 1910, with a history of photophobia and simple conjunctivitis for the past two weeks. Eyes ache after reading. Choroidal disturbances suggestive of the salt and pepper fundi of lues. Correction of plus 0.50 ○ plus 0.50 ax. 90° gave questionable relief but did not increase vision, which was: Right eye 20/20 — 4, and left eye 20/15 — 4. Was seen again September, 1911, when the fundi were more pronouncedly disturbed with a slightly changed refraction, vision right eye, 20/60 plus 4, and left eye, 20/80 plus 2.

Next seen January 13, 1916. Fundi appear somewhat granular, choroidal vessels abnormally visible with glistening points at each macula. With correction, vision each eye equals 20/30.

About five weeks ago six per cent sugar showed. Tonsillectomy and Allen treatment have been resorted to. Weight increasing.

Corneal Ulcer.

Dr. Neeper presented Mr. B., aged thirty-nine years, from whose eye he had removed a foreign body, just above the center of the cornea, November 2, 1915. This healed without incident, but the patient returned six days later with a small ulcer on the cornea near lower nasal limbus, some six millimeters distant from the seat of the foreign body. On the 11th two small ulcers appeared midway between the first ulcer and the corneal center. The ulcers have not been deep but have spread, including the lower central corneal tissue.

Discussion.—Dr. F. R. Spencer and Dr. W. A. Sedwick both thought the condition might be due to tubercular infection.

Dr. D. H. Coover said that in such case he would use protonuclein.

Glaucoma.

Dr. Neeper also exhibited this patient. Mrs. D., aged twenty-nine years. First seen June 28, 1915, with a history of the right eye having been painful for the past three years, and blind for the last two. No perception of light. Tension about plus two, pupil nine millimeters in diameter. Anterior chamber shallow. The painful attacks have become more frequent the past few months and last about ten minutes. This eye had been struck with a bough of a bush more than three years before, but at the time the pain was not great and she went on to Sunday school. Right eye transilluminates normally.

January 12, 1916, tension of left eye fifty-five to fifty-eight millimeters, with vision 20/15 plus; field for red slightly contracted, normal for green. Fundus slightly hyperemic. No cupping of the disc or other glaucomic evidence.

Choked Discs.

Dr. A. C. Magruder presented Mr. F. G., aged forty years. Family history negative. Has had measles, whooping cough, diphtheria when six or seven years old, scarlet fever at thirteen, and la grippe. At the age of twenty-one was struck on the head, near parietooccipital suture, with a rock and was unconscious for twenty minutes.

For past eighteen years has been working as a mechanic for a railroad, during which time he realized that he could not see well, but never wore glasses. Six or seven years ago noticed that it required an effort to read, although he had no difficulty in doing his work. Eyes blur and streaks appear which clear up on looking intently.

Ophthalmoscope reveals choked discs, the left being the more pronounced. Vision, 20/40 in each eye. There is staggering gait with tendency to fall to right or left.

Diagnosis of nonlocalizable brain tumor, for which he strongly urged early decompression operation, to preserve, insofar as may be, the remaining eyesight.

Discussion.—Dr. F. R. Spencer thought that it might be due to cerebellar tumor.

Dr. F. E. Wallace advised X-ray examination.

Dr. D. H. Coover, because of the character of the macular changes, believed that a kidney lesion might possibly have something to do with causation.

Drs. Patterson, Crisp and Neeper suggested that a Wassermann test be made.

Paralysis of the External Ocular Muscles.

Dr. Magruder presented F. J., thirty-three years old. Eleven years ago was treated for lues. Wassermann negative five years ago. No manifestation of disease until August, 1915, when he noticed drooping of the upper right eyelid and diplopia which interfered with work and locomotion. On September 1, 1915, when he first saw him, there was complete paralysis of all the muscles of the eyeball except the external rectus.

Diagnosis: Paralysis of the motor oculi nerve, specific in nature. The interesting point is that with large doses of iodid (eighty grains three times a day), also mercury and salvarsan, no improvement can be noticed except that the ptosis is somewhat less.

Discussion.—Dr. Coover said that he would push the potassium iodid to four hundred grains a day.

Dr. Neeper would try sodium cacodylate.

Corneal Laceration and Opacity.

Dr. Magruder also had present B. W., nineteen years of age, whom he had first seen on September 3rd, with history of having been struck in left eye with a rock two days before. Eye very painful and red. Wound in lower corneal margin with iris prolapse. Next day protruding iris found to be firmly cemented to corneal wound. This was liberated and snipped off, considerable hemorrhage appearing in anterior chamber. Edges of iris did not resume their normal position, and three days later he attempted to replace them, but without success, fearing too much interference, as the eye was still highly inflamed. September 9th to 13th, Dr. Neeper saw patient and used fluorescin for diagnostic purposes. On the 13th he first noticed a corneal opacity which covered the entire cornea except at the upper margin, where it was clear for about one millimeter. Atropin, dionin and high frequency were used, and the corneal opacity began to very slowly clear up. It would take no stain. The general condition of the eye was much better; pain and redness about all gone, but some opacity remained. It looked at first like Descemetitis, but later resembled an interstitial keratitis. Media clear before hemorrhage; poor vision following absorption of hemorrhage, which at the time was thought to be due to the corneal opacity, but as this cleared up so that the fundus should have been seen, it was found that no reflex could be obtained and the vitreous appeared milky. There may be a detached retina. Corneal opacity now covers about half the cornea. Wassermann negative. Vision, light perception, except from lower field patient can distinguish objects.

Iridocyclitis Due to Pyorrhea.

Dr. W. A. Sedwick reported a case of recurrent iridocyclitis, the cause of which had long remained obscure. The first attack had begun in December, 1911, and was treated successively with sodium salicylat, mercurial inunctions combined with potassium iodid (a Wassermann test having proved positive) and atropin locally, with but temporary relief. Slow recovery followed the use of a blister on the temple and the administration of salvarsan, but the pupil remained fixed and irregular. A second attack, accompanied by severe pain, occurred in March, 1915, and lasted, in spite of treatment, for two or three weeks, subsiding suddenly after the application of three Swedish leeches to the temple. A relapse five days later was again relieved by the use of leeches. Another attack in October, 1915, was equally resistant to treatment. Examination of the mouth then showed the presence, beneath the gums of such teeth as were not false, of pus which was easily expressed. All medication was stopped and the patient at once sent to his dentist, who pulled the teeth. The patient slept that night for the first time in several days, and made a rapid recovery without further treatment. The case was another example of what Beaumont had termed "the dethronement of iridocyclitis from the position of an independent disease to the secondary one of a complication."

Discussion.—Dr. Sedwick, in closing the discussion, gave the results of the work of Dr. Anna Williams of the New York Health Department, following her investigations of the amebic diseases of the mouths of school children between the ages of five and sixteen years. She found the ameba present in twenty-nine per cent of children with healthy gums; in thirty-seven per cent of children with healthy gums but diseased teeth; in sixty-five per cent of children with tartar and receding gums, and in ninety-one per cent of those having spongy and bleeding gums. The doctor then asked what, if any, advantages might be expected following emetin treatment in ocular inflammation secondary to pyorrhea?

Meeting held February 12, 1916. Dr. H. R. Stilwill presiding.

Lime Burn of the Eye.

Dr. W. H. Crisp presented a young man of nineteen years, who three weeks earlier, while bearing down heavily on a whitewash spray pump, in order to overcome an obstruction in the hose, had separated the hose from the pump and squirted the whitewash into his right eye. A portion of the whitewash, which had been freshly mixed from unslaked lime, had remained for nearly an hour in the upper cul-de-sac. The upper cul-de-sac was already completely obliterated, the upper tarsus concave inward; the lower cul-de-sac in fairly good condition, and the cornea, the cloudiness of which had steadily increased, was becoming gradually encroached upon by the red and thickened conjunctiva. Was there any prospect that this eye would retain sight?

Discussion.—Dr. E. M. Marbourg found olive oil to give the best results when used immediately.

Dr. D. H. Coover said that he was accustomed to the use of egg membrane to prevent adhesions forming.

Dr. Melville Black said the worst burns were usually from lime, caustic soda or potash. He recalled the case of a boy who was making a volcano with unslaked lime; result of the eruption was the worst burn of an eye that he had ever seen and hopeless loss of the eye. In bad cases there is nothing that can do much good.

Dr. Edward Jackson believed that the final result of the case shown by Dr. Crisp would be bad.

Dr. W. C. Bane said that some five years ago he had seen a boy who had put lime in can—there was an explosion and both eyes were destroyed.

Bullet Injury of the Eye.

Dr. W. H. Crisp presented a boy of six years, who three weeks earlier had been shot in the right eye with a bullet fired from a homemade cannon, the essential part of which was a sawed off .22 rifle. The bullet had split the cornea and sclera into a number of triangular flaps, and had apparently passed through the eyeball, glanced against the bone at the upper part of the orbit and passed downward through the cheek to reach a final resting place behind and somewhat internal to the angle of the right jaw. The general course was shown on an X-ray plate by a number of small fragments of lead which had been left in the track of the bullet. The eyeball was now greatly shrunken and sunk deeply into the orbit. Was it in any way desirable or advisable to retain the shrunken globe?

Discussion.—Dr. Black thought that it would have been good practice to have eviscerated contents when the case was first seen.

Dr. J. A. Patterson believed that Wilson's policy, at the time of the injury, was safer, for the boy, but at this time enucleation was the proper thing.

Dr. Jackson said that the injury was similar to injuries now occurring at the seat of war, and spoke of the custom of removing foreign pieces lying just in front of the optic nerve, not, however, opening its sheath. He believed that enucleation should be done in this case.

Glaucoma.

Dr. W. F. Matson presented Mrs. N., aged fifty-two years. February 8, 1916, tension of right eye plus three, that of left eye plus one.

Pupil of right eye widely dilated, that of left eye four millimeters. Pupils do not react to light. Right eye very painful; left, slightly so. Right eye vision, fingers at twenty inches, with the vision of the left eye still good. History of pain and loss of vision in right eye for one week.

Diagnosis: Glaucoma, and as the condition has been steadily improving under the instillations of eserin, operation has been deferred.

Dr. Matson asked should iridectomy be done on the right eye, notwithstanding the benefit being derived from the use of eserin?

Discussion.—Dr. Coover said that he could see no harm in doing an iridectomy.

Dr. Black advised giving a good, liberal subconjunctival injection of solution of sodium citrat in order to get the eye in the best condition possible for operation.

Atrophic Changes in Both Eyes.

Dr. W. C. Bane presented Mrs. G. H. S., aged fifty-six years. Patient was first examined April 2, 1902. At that time vision of the right eye was 6/6, with contraction of the nasal field. The left eye could see but part of the hand at one foot, the nasal field being blind and the temporal field limited to 40°. Pupils were equal and responded to both light and accommodation. Vision of the left eye had been failing for two years; no pain; no floating opacities. Tension of left eye slightly elevated. There was marked glaucomatous cupping of both discs, the right equal to — 4 D., and the left to — 5 D. Patient had occasionally noticed halos about artificial lights.

Patient was again seen August 24, 1913, at which time he came because of impaired hearing. He stated that he had not been able to see much after September, 1902, and that since March, 1903, he had been totally blind. Examination in 1913 revealed both pupils widely dilated and no vision in either eye. Right iris was devoid of part of its epithelial layer. Left lens dislocated and resting in the lower pupillary area.

Examination on February 12, 1916, shows increase of the atrophy of the right iris. Right lens has been absorbed, the shrunken capsule of which can be seen resting back of the lower portion of the iris. Left lens is freely movable and gravitates to the most dependent portion of the eye. Illumination reveals nothing but a white ground.

Discussion.—Dr. Jackson said in some cases of atrophy of the iris the cause is obscure, but in this case the dislocated lenses would account for the atrophy. Such cases show the importance of removing the lens when it first becomes dislocated.

Dr. G. L. Strader spoke of a case of glaucoma in which atrophy of the iris had taken place, though considerable vision remained.

Congenital Entropion.

Dr. W. C. Finnoff showed a baby two years old that had had entropion of both lower lids since birth. The right had now recovered, and the left was getting better as a result of using applications of collodion to hold the lids in position.

Discussion.—Dr. Black had some doubt as to whether this could properly be termed a congenital entropion, as he thought that it might be due to a skin fold. He said that in using collodion for such purposes the flexible collodion should be used.

Dr. Crisp said that he had a case with corneal trouble which caused the patient to keep the eye closed, and that it soon got so there was inturning of the lower lid, for which he applied adhesive plaster and soon corrected the trouble.

Dr. J. J. Pattee stated that he had had a case of entropion which was associated with and probably due to phlyctenular conjunctivitis.

Dr. Finnoff, in closing, said that but two cases of congenital entropion had been reported in the last ten years.

Retinitis Proliferans.

Dr. Melville Black: You will all remember this case of proliferating retinitis in patient's left eye, and when we saw him two months ago his right eye had vision of 20/30 and there were evidences of a neuroretinitis with hemorrhages above the macular region. A study of this case since that time has been most interesting. There has been a gradual change going on, and sometimes these changes were so rapid and so marked as to become almost kaleidoscopic. His vision has been reduced for possibly four weeks to about 20/200, and sometimes as low as 10/200.

There has been a gradual tendency to the formation of new vitreous membrane, and it has only been within the last few days that evidences of vascularization is apparent. You will observe by following the superior right vein to a distance of about three disc diameters above the disc, that there is a reddish blanket into which this vein disappears. This blanket is some six dioptries in front of the retina. Running downward from this point across the disc is a string of membrane which contains fine blood vessels. This string, or isthmus, connects with a membranous vascularized blanket which lies over the whole lower portion of the fundus and obscures a large portion of the disc. There are evidences of some fresh hemorrhages and blood vessels in this membrane below.

The right temporal region of the eye is very poorly seen, and this is undoubtedly due to beginning membrane formation. There is a large vein with its accompanying arteries which can be followed from the temporal margin of the disc in an upward and temporal direction until it disappears in the membranous exudate above.

The opportunity of watching a case of retinitis proliferans through its early stages is so unusual, that this presents a possibility of study in this particular rarely afforded us.

He has marked general and focal reactions to tuberculin. I have been giving him of late one-sixteenth of a milligram of old tuberculin once a week, and have not found it possible to get very much above that dose without its producing a general as well as focal reaction. There seems to be no question, in my opinion, that this condition is tuberculous, notwithstanding that this young Irishman is in the pink of apparent physical condition.

With regard to the left eye, the massive exudate still occupies the whole nasal half of the fundus with a very sharp line drawn along the temporal border, which drops off like a precipice down to the normal retinal level. The only change that has taken place in this massive exudate is the appearance of vascularization, which varies more or less every time that I examine it. On the whole, I believe there has been some improvement in this eye.

The case will again be presented for your further consideration and study.

Congenital Dislocation of Both Lenses.

Dr. Black presented Celia B., aged nine years. This child has a congenital dislocation of both lenses, upward and to the nasal side. With pupils dilated there is an aphakic crescent below and temporally, of about one and one-half millimeters wide. She is highly myopic and is now wearing — 16 D. lenses. The vision with this correction is very poor. The child looks to be poorly nourished, and she does not appear very bright mentally.

The father of this child has a congenital coloboma of the lower part of the lens of the right eye.

The question is: shall we needle these lenses, get rid of them and thus get aphakic eyes which may be nearly emmetropic, with the hope of improving vision?

Discussion.—Dr. Jackson said that he thought that vision through the outer edge of lens was always poor. Believed that it would be a good idea to needle one lens and note result.

The same opinion was expressed by all those speaking to the subject.

Blepharochalasis.

Dr. Black showed Harry, aged eleven years. About a year ago right cornea was injured by flying piece of wood. Scar resulting reduces vision to 20/200. Left vision, 20/20.

For some months preceding the injury the upper lids of both eyes had been puffy. The condition remains stationary.

The upper lids are very full and puffy, but do not bag down over the lashes. At the center of the right upper lid are red spots about one-fourth inch in diameter, with small elevated spots in the center of each.

He believes this to be a case of blepharochalasis in the early stage of edematous swelling which precedes that of atrophy.

This case will be kept under observation and, if possible, shown again a year hence.

Discussion.—Dr. Crisp said that his knowledge of blepharachalasis was confined to that gleaned from Haab's illustration, and that this did not look like such a case.

Dr. Boyd remarked that blepharochalasis was usually observed in girls about the age of puberty, and that its appearance was generally coincident with the onset of menstruation.

Complicated Cataract.

Dr. Black also presented the case of a man who a year ago had a perforating ulcer of the cornea of the right eye, at which time he had a large hypopyon, and it looked for a time as though the eye would have to come out, but by the use of cyanid of mercury subconjunctivally, the eye was saved.

He now has a dense corneal opacity, three millimeters in diameter, just below and to the nasal side of corneal center, and the iris is caught in the scar. The lens is opaque, and the question arises, shall we extract the lens?

Parinaud's Conjunctivitis.

Dr. D. H. Coover presented J. T. F., male, aged twenty years, clerk. First seen January 17, 1916.

History.—First noticed swelling of the right upper lid about December 20, 1915, which he thought was a stye. The swelling came on gradually and without pain; no secretion. At the time the lid began to swell had a swelling of the preauricular gland; three days later noticed the retromaxillary gland was swollen. Ten days later the swelling of the lid began to subside, and at this time there was quite a little secretion. Family history negative, no tuberculosis or syphilis. Patient well nourished. Has never been around animals.

Examination—Right eye vision, 6/20; left eye vision, 6/6. The right upper lid is edematous, giving the appearance of ptosis; it is not painful or tender to the touch. On everting the lid there is seen on the tarsal conjunctiva a depressed ulcer one millimeter in depth and about ten millimeters long in the horizontal meridian, a trifle to the temporal side, and extending about two millimeters from the edge of the lid to the tarsal fold. The base of the ulcer is regular, slightly depressed, with a grayish exudate. There are no polypoid growths in the fornix. The bulbar conjunctiva is puffy and thickened, lower lid normal, cornea clear.

Present Condition.—The ulcer has gradually filled until it is now slightly elevated with granulations which have not extended further than the ulcer, and in the past week have taken on the appearance of polypoid growths. Vision, 6/7.

The patient held a clerical position about three years ago in a trachoma hospital.

Treatment.—Ulcer touched with one per cent silver nitrate solution. No benefit was observed by any form of treatment. The eye was kept free from secretion.

Discussion.—Dr. J. A. Patterson asked if this had been found to be due to bovine tuberculosis?

Dr. Jackson said that he had been looking for a case of Parinaud's conjunctivitis, and that he believed Dr. Coover's case to be one.

Dr. Black thought the case one of Parinaud's conjunctivitis: suggested that tuberculin test be made.

Dr. Strader had a case three years ago thought to be Parinaud's conjunctivitis, in which he found copper sulphate to yield the best results in the way of treatment. He had seen cases of the disease with Dr. Gifford, and believed this to be one.

Hypertrophy of the Caruncle.

Dr. Coover presented a patient showing hypertrophy of the caruncle.

Vitreous Hemorrhage.

Dr. H. R. Stilwill presented W. W. D., aged forty-three years; occupation, carpenter. First seen on December 14, 1915. Complains of inability to see well in left eye for the past three weeks. Vision of left eye is fingers at four feet, and best seen from the temporal side. A large hemorrhage in the vitreous to the temporal side. Family history negative. No history of injury. No lues. No tuberculosis. Urine negative. Patient apparently in good health. The vision is gradually clearing, and at the present time, February 12, 1916, is 4/5. Right eye normal. Case is presented for opinions as to etiology.

Discussion.—Dr. Black suggested that a tuberculin test be made.

Dr. Bane thought it to be an idiopathic vitreous hemorrhage, and that it would clear up under potassium iodid.

Dr. Jackson stated that he believed all vitreous hemorrhages, other than those due to trauma, to be of tuberculous origin.

Dr. Crisp suggested that the vision be taken before and after making tuberculin test.

Glioma.

Dr. J. J. Pattee reported the following, seen on October 15, 1915, with regard to the right eye of H. D., aged three years, a twin, his mate being a healthy boy. Family history negative so far as serious eye affections or tumors are concerned. The mother said that two months previous to their visit they noticed that the child's right eye was a little bloodshot, and that the color of the eye had changed slowly until about three weeks before their visit, when the natural color of the eye gave way slowly to a yellowish white looking substance in the eye. The parents had discovered that the child's right eye was blind, or nearly so, as far as they could tell. The patient's disposition had been considerably changed for a few weeks, and he was growing more and more irritable and peevish. All symptoms were slowly progressive.

On examination found considerable injection of the eyeball; the cornea somewhat dull and cloudy, although not markedly so; the anterior chamber shallow; the iris slightly discolored and its figure somewhat altered; the pupil very much dilated and immobile, and the tension of the eye to palpation was noticeably increased. A growth was found about the disc which produced a yellowish reflex. It was a typical picture of amaurotic cat's eye.

Dr. Philip Work, a neurologist, consulted with reference to the general symptoms, reported no vertigo or vomiting, no symptoms of intracranial pressure. Patient sleeps poorly and has night terrors. Headaches, but not localized. General physical examination quite negative. Reflexes normal. Differential diagnosis to be made between syphilis, tuberculosis and glioma.

Enucleation of the eye advised; operation on November 20th. The eye was given to Dr. Carl W. Maynard for pathologic examination, who reported as follows:

Gross.—Gray fungoid mass, very fragile, covering about one-half of fundus of eye; five millimeters average thickness.

Microscopic.—Neoplasm attached only at point where optic nerve enters eye. Tumor mass consists of branching clumps of sarcoma-like cells, the masses separated by necrotic tissue. Almost no stroma between tumor cells. No neuroglia fibrils present. An occasional cell shows a differentiation toward the nerve cell type, with axon formation. In many places the cells are grouped about an opening in which there is a tendency to the development of rods and cones. Also occasional perivascular grouping about delicate walled blood vessels. Tumor cells can be traced into the optic nerve as it enters the eye and grouped between the fibers of the nerve stump.

Diagnosis.—Neuroblastoma.

The case has not been seen since he was operated, which was two and a half months ago. The family stated in a letter that, so far as they could tell, the eye had healed and there has been no evidence of recurrence. The family physician has seen the child a number of times, and says that the socket is clean and nicely healed. Of course it is too early to tell what the ultimate outcome will be.

On February 24, 1916, the socket was filled with the tumor growth so that the lids were slightly separated by a small protrusion of the tumor. The child was exceedingly peevish. The growth for the last few days has been very rapid. The family physician and parents could not detect any recurrence until four weeks ago.

Cilioretinal Taking Place of Lower Temporal Artery.

Dr. Crisp reported a case in which the right lower temporal artery was a cilioretinal vessel, not derived from the central artery of the retina. The vessel became clearly visible a short distance from the lower temporal margin of the disc, and the reflected portion, coming from the choroid, could be traced practically to the disc margin with a low minus lens.

Morax-Axenfeld Diplobacillus.

Dr. W. M. Bane showed a beautiful slide of the Morax-Axenfeld diplobacillus.

Removal of the Tarsal Cartilage With Underlying Conjunctiva for Trachoma.

Of much interest to those present was the removal of the tarsal cartilage with underlying conjunctiva for trachoma, and a Ziegler for entropion, performed by Dr. Coover.

E. T. Boyd,
Secretary.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Stated Meeting, Held December 9, 1915. Dr. Wm. Zentmayer, chairman.

Subject, "The Accessory Sinuses of the Nose."

"The Anatomic Relationship of the Eye to the Accessory Sinuses."

Dr. J. P. Tunis (by invitation. Illustrated by forty lantern slides): The close anatomic relations between the accessory sinuses and the contents of the orbit are abundantly proven, both by dissections of these parts in the cadaver and by rapidly accumulating clinical evidence. The greater the amount of anatomic material examined, the more one is impressed with the wide variation in the size and capacity of these air spaces. It follows that the larger they are the closer become their relations to the orbital contents. These observations are based on an examination of several hundred adult skulls and over five hundred wet preparations. Briefly, the optic nerve, or some equally important part of the orbital contents, may come in close touch with the frontal, the posterior ethmoid, the sphenoidal sinus or the maxillary antrum, by the overdevelopment of these air spaces. This can be readily proven by reference to my specimens.

The sinuitis which is most apt to cause optic neuritis develops either in the posterior ethmoid or in the sphenoid. Frequently this all important nerve may be seen occupying a canal of its own, running through the posterior and outer part of either one of these spaces. The works of Onodi are particularly rich in such material. About a dozen of my lantern slides are copies of his illustrations. On one side the optic nerve may come in close relation with the sphenoidal sinus, and on the other with the posterior ethmoid. In several of these specimens the optic nerve was separated from these air spaces by a tissue covering no thicker than an ordinary sheet of writing paper. In such case, chronic inflammation of the sphenoethmoidal space could readily infect the optic nerve.

As illustrating the great variation in the development of these sinuses, let us take, for example, the sphenoid. As a rule the sinus develops in the body of this bone only, with an average capacity at maturity of about four cubic centimeters. Frequently, however, this development may extend outward into one or both of the greater wings of this bone, with corresponding increase in the size and capacity of the sinus. It is in such cases that special canals for the optic nerve are developed.

Similarly one of the specimens shows such a very considerable development of the frontal sinus posteriorly as to bring it in close touch with the optic foramen. Clinically, in such cases frontal sinuitis per se might readily have caused optic neuritis.

Chronic inflammation of the maxillary antra may extend upward to the orbit, especially if these spaces are of more than average size. In this connection it is well to bear in mind the fact that patients past middle life have thinner roofs to their antra than those of less mature years. In other words, as we pass the age of forty-five, nature, as a rule, brings about a more or less gradual absorption of the bony part of the antral roof, so that as age advances this separation between the antrum and the orbit becomes more and more membranous.

In this connection let me quote from an article of mine in the *Laryngoscope* for October, 1912, entitled "Sphenoidal Sinuitis in Relation to Optic Neuritis": 1. Anatomically, the posterior ethmoid and the sphenoidal sinus must be regarded as having practically the same intimate relations with the optic nerve. 2. Infection of the optic tract by the spreading of sphenoidal or posterior ethmoidal sinuitis is due more to continuity and proximity than to any peculiar arrangement of the lymphatic system in this region. 3. Sphenoidal or posterior ethmoidal sinuitis may occur independently and unassociated with frontal sinuitis or anthritis. 4. When the sphenoidal sinus is the seat of chronic inflammation, the importance of a prompt diagnosis and the institution of equally prompt remedial measures cannot be too much emphasized.

"The Optic Nerve in Affections of the Sinuses."

Dr. Wm. Zentmayer: It could not be otherwise than that such a highly specialized nerve as the optic, having such a close anatomic topographic relation to mucous lined cavities, should suffer at times when these cavities are the seat of inflammation. At the same time it must not be overlooked that considerable protection is afforded by the periosteum. The analogy that one hears at times, drawn between these structures and the appendix and the peritoneum, to illustrate their liability to associated involvement, is not a close one, as in the latter instance we have to do with a rudimentary structure, whereas in the former we have, developmentally at least, normal structures.

The changes in the optic nerve manifest themselves as a retrobulbar neuritis, papillitis of a slight degree, and an actual papilledema. The relative frequency of these conditions, calculated from the case reports published recently by Elschnig, shows that in unilateral cases retrobulbar neuritis is present in twenty per cent; papillitis occurs in fifty-five per cent; papilledema in twenty-five per cent. In bilateral cases retrobulbar neuritis occurs in forty-five per cent; papillitis in thirty-three per cent; papilledema in sixteen per cent. This gives a papillitis in about one-half of the cases. The distinction between these groups I have based on the ophthalmoscopic findings—negative, slight haze or swelling of the papilla, and decided edema and prominence of the papilla. The visual disturbance occasioned varies from slight impairment to absolute blindness. The onset is relatively rapid. When it is possible to take the visual field, in about twenty-five per cent of the cases, a central scotoma will be found, absolute in some and relative in a fewer number. The findings in the studies made of the blind spot have not been harmonious. Hoeve, who first studied them, found enlargement for color. This was confirmed by Gjessing, who found it in fifty per cent of his cases. It should be stated that later observations would indicate that it by no means occurs with this frequency, certainly not as an early symptom. Among exceptional field findings are ring scotoma and peripheral contraction.

"Changes in the Orbit."

Dr. William Campbell Posey: It is now generally recognized that inflammation of the orbit of endogenic metastatic origin is rare, and that most diseases of this cavity are ectogenic, being occasioned by an inflammation of one or more of the accessory sinuses of the nose. The character of the symptoms and the form of inflammation which disease of the sinus excites in the orbit depends, first, on the particular sinus or group of sinuses affected, and, secondly, on the nature of the inflammation of the sinus. Thus, for example, a chronic distention of the walls of a sinus (hydrops) may occasion dislocation of the globe, with the necessary attendant of more or less functional derangement of the ocular muscles, giving rise to asthenopia or actual diplopia; or the refraction of the eye may be altered by pressure, causing changes in the axis or the amount of the astigmatism, and, finally, disturbances in the proper canalization of tears may result from a displacement of the puncta lacrimalia, or by a lesion in Horner's muscle in the lid. In chronic cases vision is but rarely affected, for even when there is exophthalmus the sigmoid flexure in the optic nerve permits it to elongate and escape injury from the traction to which the displacement of the globe subjects it; in acute inflammatory processes of the orbit, on the other hand, vision is apt to be more or less impaired, either from the very pronounced displacement of the globe which occurs in this class of cases, or from a direct implication of the nerve itself in the inflammatory process.

One of the earliest signs of the involvement of the orbit is a change in the contour of the orbital ring. Usually this is occasioned by a distinct projection into the orbit cells, but at times the rim may be simply raised and roughened, either wholly or in part, by periostitis. In some cases of sinuitis an acute cellulitis of the orbit may develop without premonitory signs, and lead to the formation of an abscess which may point and discharge itself either externally through the skin of the lid, or in rarer cases into the antrum, nose or tear sac. In other cases the sinuitis causes a circumscribed swelling to appear in various parts of the orbit, which may be either as hard and unyielding as bone, or may convey to the finger the impression of containing fluid.

Although it is frequently impossible by means of the ocular symptoms alone to make a differential diagnosis of the particular sinus involved, in many cases the character of the displacement of the eyeball is of significance. Thus, disease of the frontal sinus, which is the most frequent form of sinuitis to occasion dislocation of the globe, by reason of the extreme thinness of the bone which separates its cavity from the orbit, causes the eyeball to be displaced down and out. Mucoceles formed from the ethmoid cells are circumscribed, and do not, as a rule, occasion any considerable diminution in the size of the orbital cavity; when displacement of the globe does occur, however, it usually is up and out. Dislocation from a mucocele of the sphenoid cells is uncommon, as in the rare cases in which mucocele develops in these sinuses, the anterior wall, being the thinnest, is the first to give way and the orbital cavity escapes compression. The orbit enjoys a similar immunity in hydrops of the antrum, for the inner wall of these cells is the thinnest and is the first to yield, and the nasal cavity is encroached on. Proptosis always indicates pressure from behind the globe.

The location of the pointing of the abscess may also be of value as indicating the particular sinus which is affected; abscesses of the frontal sinus tending to perforate at the middle of the upper lid, or at the superior angle of the orbit, and those due to ethmoiditis at its lower inner angle. A general orbital cellulitis may be occasioned by an acute perforation of any sinus. Disease of the frontal sinus may be frequently diagnosed by redness and swelling of the skin over the sinus, and by the pain which may be elicited by pressing on the roof of the orbit in the neighborhood of the pulley of the superior oblique muscle; indeed it is often possible to outline the area of the sinus by noting the extent of the tenderness.

Dr. Zentmayer (closing): It is to be regretted that time did not permit Dr. Tunis to refer to the anomalies met with in the accessory sinuses. In a recent paper on "Contralateral Visual Disturbances," Onodi describes instances in which the sphenoid sinus is separated from the homolateral optic nerve by a dense plate of bone, but is in contact with the optic nerve of the contralateral side; also an instance in which the two sinuses are superimposed; also one in which the left sinus is in contact with the right optic nerve.

It would seem reasonable to suppose that a sinuitis could produce a uveitis through absorption of toxins, just as a focus of pus anywhere in the body may be responsible for a polyarthritis.

Dr. Reber's statement that a bilateral lesion indicates a systemic cause, whereas a unilateral lesion points to a local cause, is not borne out by Elschnig's series, as he had more bilateral than unilateral cases.

WALTER W. WATSON,
Secretary.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Meeting held October 4, 1915. Dr. McCluney Radcliffe, chairman.

Dr. William Campbell Posey exhibited the following cases:

1. A Case of Traumatic Ptosis Operated on by the de Wecker Method.

The patient, a young man, had had the left upper lid torn away by a steel hook. When first seen after the accident all but the outer third of the lid was evulsed. His family physician had sewn the lid roughly into position directly after the accident; but when first seen by Dr. Posey the lid was a shapeless mass, hanging down and over the lower lid. Dr. Posey's first procedure was to cut away all superfluous cicatricial and granulation tissue and reunite the edges of the wound. After the healing due to this had been effected, the lid was raised by a Tansley-Hunt operation. On account of the injury to the tissues this operation was only partially successful, the width of the palpebral fissure being but four millimeters; so a de Wecker operation was done, the subcutaneous stitches being held in position for two weeks. The ultimate effect was excellent, the fissure being now seven millimeters in size. It is thought that the effect of the operation will be increased as time goes on, as the subcutaneous cicatricial bands produced by the sutures contract.

2. Exhibition of a Case of Socalled "Juvenile Glaucoma."

The patient, a young man, twenty-two years of age, without any family history pointing to glaucoma, had gradual loss of vision in each eye for a year or more. Examination showed atrophic nerves with deep glaucoma cups. Tension equaled twenty-eight in each eye. The form fields were much contracted and the color fields obliterated. Vision was reduced to 2/40 in each eye. Iridectomy was performed on both eyes under ether, with resultant 4/40 vision in each eye. Dr. Posey thought the etiologic factor was probably alcohol, as the patient confessed to taking four or five drinks daily for six years or more. There was also a possibility of his having taken wood alcohol. Dr. Posey believed the glaucoma to be really an instance of the secondary type of this disease, the glaucoma cups having originated in consequence of the softening of the optic nerves from the alcohol, and perhaps an accompanying low grade uveitis due to the same causes, which had produced a blocking of the posterior lymph passages of the eye.

3. Deformity of the Right Upper Lid Due to Traumatism.

Dr. Posey exhibited a case of deformity of the right upper lid in a young man, which he had corrected by a blepharoplasty. The deformity was the consequence of a kick upon the orbit. The inner canthus of the right eye had been contracted downward and somewhat outward, so that the upper lid assumed the appearance of a very broad epicanthal fold. The canthus was placed in the proper direction by incising the scar tissue and sewing it in the position normally occupied by the palpebral ligament. The broad epicanthal fold was narrowed by excising a semilunar strip of skin. Healing was prompt, and the deformity caused by the accident almost entirely corrected.

A Case of Pigmentary Degeneration of the Retina Complicated by Glaucoma.

Dr. William Zentmayer showed a case of advanced pigmentary degeneration of the retina in a woman fifty-eight years of age. There was a posterior polar subcapsular opacity in the lens. The unusual feature in the case was a high degree of sclerosis of the choroidal vessels. Vision in the right eye equaled 6/24. In the left there was merely light perception. The field in the right eye showed concentric contraction to within fifteen degrees of fixation. One week before coming under observation she had had an attack of acute glaucoma, which was aggravated by the use of atropin by her family physician. The eyeball was stony hard, and all the other phenomena of suddenly increased intraocular tension were present. Trephining of the sclera, combined with a small peripheral iridectomy, was done. The tension, three weeks after the operation, was still below normal. The patient recognized hand movements at one meter. Glaucoma as a complication of pigmentary degeneration of the retina has been observed several times. Instances have been put on record by Heinrichdorf, Bellaminoff and others. Both chronic and acute types have been seen. The reason for the rise in tension has not been determined. In the above case it is probable that the high grade sclerosis of the choroidal vessels was a factor. A sclerosis that had affected more largely the verticose veins than the arteries would explain the attack of glaucoma.

A Case of Buphthalmos Benefited by Tuberculin.

This case was presented by Dr. J. Milton Griscom, who said that the patient, a girl of twelve years, had applied to Wills Hospital for treatment August 27, 1915. Vision in the right eye was 5/200. Blepharitis marginalis and interstitial infiltration of the cornea were found, with a central macula (one millimeter) and some vascularity. The anterior chamber was somewhat deepened. The iris was normal, and the pupil reacted promptly. No fundus details could be seen. In the left eye there were light perception and projection. Buphthalmos was present. The cornea was large, with a central macula (three millimeters) and some vascularity. There was marked interstitial infiltration. The anterior chamber was deep. The iris was normal in color, and thirteen millimeters wide. The pupil was sluggish. No fundus details were visible. There was slight scleral injection, also ciliary stretching. The tension equaled forty-three millimeters Hg. Blepharophimosis was present, with slight roughness of the conjunctiva. There was also lacrimal obstruction. The urine was negative. The family physician stated that the condition has existed for nine years. He thought that it had followed an attack of measles complicated with a tubercular element. The patient's father had died of tuberculosis, and her cervical glands were enlarged. The attack of measles occurred nine years before admission. She had been treated by various oculists at a New York hospital, with no improvement in the condition of the eyes. She was admitted to Wills Hospital on the 3d of September, and was operated upon under ether, external canthotomy with rapid dilatation of the tear duct being performed on both eyes. The von Pirquet test was positive. Ten injections of tuberculin, one-fiftieth milligram, were given, and ten injections of phylacogen, two cubic centimeters. The house tonic was prescribed. Eserin, grain one, was instilled into both eyes. The ocular condition gradually improved, and also the general health. Both corneæ became clearer, and the left globe perceptibly smaller. There was a slight reduction in the size of the cornea and the depth of the anterior chamber. When discharged, November 10th, the iris was twelve millimeters wide, and the corrected vision as follows: Right eye, sphere plus 2.25 D. equals 20/70; left eye, sphere minus 0.75 D. combined with cylinder minus 1.25 D., axis 30°, equals 20/100.

A Case of Proptosis Due to an Orbital Tumor.

Dr. James Hunter, Jr., presented this case. The patient, a married woman, forty-seven years old, had had, in September, 1913, an attack of severe pain over the left eye, associated with headache. The attacks would commence in the morning, reaching their maximum intensity about nine o'clock, and would compel the patient to take to her bed. The pain would last until about four p. m., when it would ease enough to permit her to resume her usual work. She had sought medical advice, with little or no relief, the pains becoming steadily worse. In August, 1914, there was pain, confined to the globe. The eye began to swell, and there was marked edema of the lids. The latter was at first relieved by cold compresses, but soon became permanent. The patient applied for treatment May 24, 1915, with much the same appearance as she presented when exhibited by Dr. Hunter at this meeting; but the globe was then not quite so prominent. She had ptosis, palpebral fissure at the midpupillary line, and a pupil of 4.5, which reacted promptly. There was diplopia on extreme upward rotation. The tumor mass above the eyeball, to the nasal side of the orbit, was more prominent when the patient was shown than it had been on admission. Examination of the fundi was negative. The tumor was apparently one of slow growth, springing from the periosteum of the nasal side of the orbit, fifteen by twenty millimters, with a soft point of apparent fluctuation at its temporal edge. An X-ray of the sinuses was negative.

Meeting Held November 9, 1915. Dr. P. N. K. Schwenk, chairman.

The Indications for Operation in Glaucoma.

Dr. William Campbell Posey discussed this subject. Secondary glaucoma was not considered, these indications applying to primary glaucoma only. He said that operations should be performed:

1. In all cases of acute and subacute glaucoma, and in all chronic cases, on the manifestation of any inflammatory glaucomatous symptoms.
2. In all cases of chronic glaucoma in which there is doubt of the patient's cooperation in the persistence in the miotic treatment throughout the remainder of life. This includes practically all hospital cases and such private patients as may be of a weak and vacillating disposition.
3. In all patients with chronic glaucoma who reside at such a distance from places where proper ophthalmic care may be obtained that they are unable to report at sufficiently frequent intervals for the supervision necessary for the proper and safe carrying out of the miotic treatment, or for operation in the event that inflammatory symptoms arise.
4. In chronic patients under fifty-five years of age, when the field of vision and central vision are good, an operation upon the most affected eye is advised, miotics being employed in both the operated and the unoperated eye for the remainder of life. Operation upon the second eye should follow, if subsequent observation shows that vision is maintained better in the operated than in the unoperated eye.
5. In all cases of chronic glaucoma, without regard to age or the development of the disease, in which miotics have been given a faithful trial for at least six weeks or two months, as evidenced by the constant maintenance of pupillary contraction to almost pin-point size, and in which vision and the field of vision show progressive deterioration.

Cyclodialysis is preferred in all cases in which operation is demanded if there be a hemorrhagic tendency or the field of vision is very much reduced. Iridectomy is reserved for all other cases. The trephining operation has been relinquished, as it appears to be a more dangerous procedure than iridectomy, on account of the opacification of the lens that follows in not a few cases, either immediately or remotely, after the operation. Furthermore, even in cases in which these complications do not arise, it has not been proved that the visual results after trephining are better than those obtained by a properly executed iridectomy.

In all cases not included under the five headings given above, miotics should be employed with great zealousness and persistence, four times during the day. The maintenance of vision by this method does not warrant the gloomy prognosis so often rendered in cases of chronic glaucoma.

Discussion.—Dr. Zentmayer, discussing Dr. Posey's paper, said that, considering that neither the miotic nor the operative treatment of simple glaucoma is curative, and that the nonoperative treatment of any condition is preferable when it gives as good results, he thought the miotic treatment to be the treatment of choice in appropriate cases. Operations should be advised in dispensary patients, if there are no contraindications. Because of the likelihood of neglect when irksome treatment is to be continued over a long period of years, operation should be done on patients in all walks of life under fifty-five years of age. Dr. Zentmayer agreed with Dr. Posey in preferring iridectomy, except in the presence of marked angiosclerosis.

Dr. Schwenk stated that, in his opinion, iridectomy with a Graefe knife is the best operation today. An iridectomy with a keratome is not equal to an upward cut, according to his view. The reason for this opinion he was not able fully to explain; but he thought it might be that the downward cut closes Schlemm's canal more than the upward incision. He believed that it is not the size of the iridectomy, but the free, small iridectomy, that serves the end.

Sympathetic Ophthalmia Twenty Years After Injury.

Dr. Henry L. Picard showed the case of a man who had had a piece of steel removed from the vitreous twenty years before, the eye having remained quiet until one year ago, when irritating symptoms developed (pain, pericorneal injection and bullous keratitis), which partly cleared up under treatment. Later, after a flare-up, he was admitted to the hospital for a sclerocorneal trephining, through the opening of which a small iridectomy was performed. The recovery was uneventful, and the patient was discharged. He returned later with more pain. The eye was enucleated, and a piece of steel, 5x2x1 millimeter, was found in the vitreous.

An Eye With Steel in the Vitreous Enucleated Fourteen Years After the Accident.

Dr. Picard also showed the case of a man who had gone blind in one eye after an accident, and said that Dr. Frank Fisher had removed the eye after a period of fourteen years, when the orb showed signs of irritation, and had found a small piece of steel lying in the ciliary region.

An Eye Showing Iridodialysis, Dislocated Lens and Ectasia of the Ciliary Region, Enucleated Twenty-five Years After Accident.

Dr. Picard also exhibited a specimen which he had removed, two weeks previously, from a colored woman, twenty-eight years of age, who had had a darning needle thrust into the eye when she was three years of age. The eye, at the time of operation, had a tension of plus two, and showed an iridodialysis, iridodonesis, and an ectasia of the ciliary region, above and below the cornea, on the same side as the iris had been injured.

While he recognizes the fact that all foreign bodies should be removed from the eye, Dr. Picard thinks that the first two cases show that if the foreign substance becomes encapsulated, the length of time before it becomes irritating is indefinite.

Discussion.—Dr. Burton Chance said that Dr. Picard's case reminded him of one of which he had had the care in Dr. Schwenk's service, a number of years before. It was that of a man who had applied for the relief of an intractable corneal ulcer. The ulcer resisted all forms of treatment, and the anterior segment became so affected that the eye had to be excised. An immediate examination of the globe disclosed a good sized metallic mass imbedded in the choroid and retina, near the optic nerve; and a study of the tissues revealed evidences of extensive siderosis. It was learned later that the man had been struck in the eye by a spark from a blacksmith's forge twenty-six years previously; but no attention was paid to the injury, and, until a short time before reporting at the hospital, he had had useful sight. At that time he received a trivial injury, which was followed by persistent irritation, and finally by ulceration of the cornea. Chance's observation on this case had led him to suspect the presence of retained foreign body in all cases of protracted ulceration without definite history.

Operation for Contracted Socket.

Dr. Peter N. K. Schwenk presented a case of contracted socket for which he had devised a new operation that, in his opinion, is superior to either the Wiener or the Maxwell procedure, at least for this particular case. The patient had lost his right eye in 1904 in consequence of a bottle explosion. The eye had to be removed. The patient had not been able to retain a glass eye for six months or more past, owing to his not having a cul-de-sac below, and because the commissure was contracted. The operation conceived by Dr. Schwenk consists in dissecting or loosening the orbital conjunctiva from the border of the lower lid to three millimeters above the stump of the optic nerve, by inserting a curved-on-the-flat scissors under the conjunctiva at the outer canthus, avoiding making any other opening in the conjunctiva. He then makes a subcutaneous opening from the outer canthus along the lower lid margin, about six millimeters from the edge of the lower lid down, and extending the full length of the lid, by means of a Graefe knife. He then unites the cavity of the subcutaneous dissection with the cavity of the submucous dissection by cutting scissors, avoiding an external opening. Then a double needle suture is inserted, six millimeters back from the lid margin, into the loosened conjunctiva, the needle being carried into the floor or apex of the subcutaneous dissection, thus transplanting the conjunctiva from the orbit into the subcutaneous cavity. Then both needles are passed through the skin or lid, six millimeters below the margin, and through small pearl buttons the sutures are tied. It will only be necessary to use three sutures and insert a conformer. In this case the stitches were removed eight days after the operation. The operation was done ten days before Dr. Schwenk made this report. He said that the conformer could be taken out and reinserted with ease, and that the result was better than he had anticipated. There was no deformity remaining, and no raw surfaces save the linear incision made by introducing the scissors and knife, All the cutting was submucous and subcutaneous.

Discussion.—Dr. Burton Chance stated that he was of the opinion that the Maxwell operation should not be selected in cases like that which Dr. Schwenk had so successfully relieved by his ingenious procedure. In the five or six cases of the Maxwell operation that Dr. Chance had seen, and one case from his own experience, he would approve of that procedure in the selected cases only. In the case of the patient shown by Dr. Schwenk, the mucous surface was unusually extensive; but, at the same time, the contraction was so great as to make it impossible for him to wear any form of glass eye. In regard to the apparent similarity existing between Dr. Schwenk's procedure and that described by Weiner at the meeting of the American Medical Association in 1908, Dr. Chance said that Weiner's operation, if he understood it correctly, consisted in an extension of the principles of the Arlt operation for the relief of symblepharon, insofar as it provides for the dissection of the mucous membrane free from the orbital mass, the suturing of it to the tarsal tissues, and the covering over of the raw surface by skin grafts applied to a conformer worn in the socket. Dr. Schwenk's procedure, Dr. Chance continued, contains no incisions into the conjunctival surface; for he inserted closed scissors at a small puncture over the outer canthus, carefully undermining the conjunctiva and releasing it from all adhesions to the orbital mass. After this he inserted a Graefe knife to sever the subcutaneous tissues from the tarsal, thereby connecting the subcutaneous cavity with the subconjunctival. He then improvised a new sulcus, or cul-de-sac, by fastening the voluminously loose mucous membrane behind and below the tarsal tissues by means of sutures that were brought out and tied over the skin surface. Dr. Chance thought that while this operation is extremely simple, its simplicity makes it most difficult to describe.

Dr. Zentmayer said that Dr. Schwenk's ingenious operation was evidently applicable only to cases with a considerable amount of conjunctival tissue. He was still of the opinion that in cases in which the eye had been destroyed through burns, leaving little else than scar tissue in the orbit, the Maxwell operation would give the best results.

V-Shaped Iridotomy.

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V-Shaped Iridotomy.

Dr. Zentmayer exhibited a patient on whom he had made a V-shaped iridotomy with a Ziegler knife-needle four days young child, any procedure that diminishes the frequency of such anesthetizations is of value. He uses a straight spatula for the removal of the soft lens matter, and makes his incision in the horizontal plane of the cornea, two millimeters from the limbus. The class of cases referred to by him before a recent meeting of the State Society, in which the capsule of the lens is dense and often the seat of calcareous change, is best treated by depression of the opacity into the vitreous by the knife-needle, such a procedure giving more hope for vision than unsuccessful attempts to move the calcareous mass, either by the knife-needle or by the de Wecker scissors.

Dr. Schwenk stated that he makes a crucial incision in the lens capsule and, after the lens matter becomes semiopaque, he curettes the lens in a similar way to the method described by Dr. Risley. Loose cortical matter, when not in the capsule, acts as an irritant: and the sooner it is expressed the more quickly will the eye get well. Dr. Schwenk thought that Dr. Risley deserved to be complimented on obtaining such fine results in so short a time.

Dr. Zentmayer said that when so experienced and skillful an operator as Dr. Risley was unfortunate enough to get a slight prolapse in one case and a drawing up of the iris in another, he himself would adhere to the safer procedure of discission. While Dr. Zentmayer thought it true that this method is slow, he said that, aside from the infinitesimal danger of infection, it is safe. In most cases two discissions, supplemented in some cases by a capsulotomy, are sufficient.

The Influence of Alcohol on the Operation for Cataract.

Dr. William Campbell Posey said that doubtless the most common influence is that which exerts itself on the minds of patients, about forty-eight hours or later, after the removal of the lens; for while he did not agree with Martin, the celebrated French observer, that alcohol is responsible for most of the cases of delirium after cataract operations, he thought that it accounts for quite a number. He wished, however, to speak on the influence of the abuse of alcohol in setting up active uveal changes some days after the operation, in eyes in which healing had been prompt and without complication. He referred to the case of a man, seventy years of age, in whom the vitreous became fluid and filled with a flocculent material, in conjunction with all the signs of an acute uveitis, four or five days after the operation. In another case, that of a lawyer, aged seventy-six years, also a free user of whisky, a form of plastic iridocyclitis was set up about four days after the operation. It yielded very stubbornly to treatment. Although in neither of these cases did the urine show positive evidences of renal disease, Dr. Posey was convinced that subtle changes must have occurred in the kidneys, as well as the liver, in consequence of the prolonged abuse of alcohol, which had interfered with metabolism and had originated the inflammatory changes in the eye following the operative procedure. Such cases do best on salicylats, moderate diaphoresis, atropin, dionin, and ice locally. Later, some form of iodid is of service.

Discussion.—Dr. Risley was much interested in the cases reported by Dr. Posey. He said that it was doubtless true that the habitual use of alcohol in any form reduces the ability of the organism to resist disease or to repair injury—as after a surgical procedure. The same, he stated, is true of ether, chloroform or opium. All have seen how rapidly apparently strong, vigorous men that drink alcoholic beverages freely, live sumptuously every day, and are clothed in purple and fine linen, may succumb to disease—to pneumonia, for example. Their powers of resistance and repair are disabled. Therefore, the prognosis after surgical interference in such individuals is not good, as Dr. Risley had had many opportunities to observe.

Dr. Burton Chance remarked that he supposed that there is no condition so disappointing as to have inflammation occur after clean operations in presumably robust individuals, as had occurred in the two cases presented by Dr. Posey. Such an occurrence leads to the consideration of the peculiar condition excited by operation. Such individuals have been immune from all disease since childhood; and this being their first illness, the cataract operation develops a weak point. In such persons as Dr. Posey's patients, alcohol had served as a "preservative," and recovery from the effects of traumatism requires a continuance of its administration. From his own observation of the technic of a number of careful surgeons, Dr. Chance does not look upon such postoperative inflammation as of septic origin. On the contrary, in the class of cases under discussion, he is himself inclined to the belief that in the disintegration of lenticular particles noxious compounds are created which, together with the presence of the particles themselves, excite inflammation in the uveal tissues. This process would confirm the supposition that such inflammatory reactions are endogenetic, rather than exogenetic, in origin.

Hyalin Degeneration of the Choroid.

Dr. Burton Chance briefly reported a case of hyalin degeneration of the choroid, from Dr. Schwenk's service. In the absence of the patient, a girl of nine years, Dr. Chance showed a water color sketch of the eye ground. A remarkable feature is the play of reflexes, he said, in a negroid fundus. The disc has much opacity on its surface, but does not appear to be swollen. Scattered throughout the entire fundus, but more numerous in the temporal region, are small globular and reniform spots beneath the retina. Certain of the temporal vessels are more sharply outlined than in the normal eye. The fundus presents no signs of active inflammation; the areas are discrete and in no region show coalescence. The peripheral field of vision shows marked contraction, but no localized scotomata. The left eye seems normal in all respects, and the fields are ample. The child is an unusually intelligent Russian; but from her mother no history could be obtained pointing to a cause for these unusual ocular conditions.

Discussion.—Dr. Zentmayer said that Dr. Chance's case was similar to one that he had recently seen in consultation. A woman, thirty years of age, presented in each fundus small, bright, but not brilliant, yellowish dots, grouped about the macula; more, however, towards the nasal than the temporal side of the fovea. Similar dots were scattered throughout the fundus up to the region of the ora serrata. In one eye there was a small patch of congenital atypical pigmentation of the retina, and also a small spot of choroidal atrophy. There was a low grade night blindness. Light sense, tested by Dr. Langdon, on the Langdon photometer, showed the minimum of normal. The visual fields were contracted to within forty degrees of fixation for form, and twenty degrees for red. The case seemed to belong to the class of retinal degenerations without pigmentations.

Result of a Heisrath-Kuhnt Operation.

Dr. William Zentmayer exhibited this case to show the destructive effects of grattage and the result from combined excision and resection. As the result of grattage, broad bands of conjunctiva stretched between the lids and ball, making it difficult to secure sufficient conjunctiva to take the place of the excised tissue in the Heisrath-Kuhnt procedure. Ten days had elapsed since the operation, which had been done because of repeated ulceration of the cornea; and already the ulcers were healed. The patient stated that the eyes were more comfortable than they had been for years. On the one side there had resulted in a widening of the palpebral fissure, whereas on the other side there was a slight narrowing of the fissure.

Result in an O'Connor Operation for Squint.

Dr. Zentmayer showed this case to demonstrate a good result obtained in nearly every case that he had operated on by this method. The case was one of esotropia of forty-five degrees, in a girl eight years of age. It was only twelve days since the operation, the stitches having been removed two days before, and the patient showed about five degrees of overcorrection. Both externi had been advanced, but no tenotomy of the interni had been made.

Discussion.—Dr. Posey said that he had done the O'Connor operation upon ten patients or more, and had had great reaction follow it in two cases, the tissues at the site of the advancement having sloughed three or four days after the operation. While the results in some of the cases were extremely good, the amount of reaction obtained in two cases caused Dr. Posey to reserve his opinion regarding the value of the method until he had had further experience with it.

Dr. Chance said that the O'Connor operation, while still on trial, has amply demonstrated its efficiency. In his own experience of four cases, he had been impressed by the mildness of the reactions. In each instance the patient had been able to leave the hospital or his home by the end of a week. The total effect of the advancement had been most satisfactory in each case. Dr. Chance had not seen ulcertaion, necrosis, or any other disturbance of the tissues about the knots; but in his first case a cyst was noticed at the lower angle of the conjunctival scar. This cyst he assumed to be in some way connected with the dissolution of the catgut, although it might have been caused by the inclusion of the conjunctival tissues within the wound. He snipped it and after an interval of several months it has not reappeared.

Meeting Held January 4, 1916. Dr. P. N. K. Schwenk, chairman.

Dr. Santos Fernandes, of Havana, Cuba, as a guest of the society, addressed the members as follows:

GENTLEMEN:—It is the source of the greatest gratification in my life to appear before this cultured society, which counts among its members so many competent leaders in ophthalmology, in a city like Philadelphia, which may be considered, if not the cradle of the study of diseases of the eye, certainly one of the centers where this branch of medicine was first practiced as a true science.

I owe a great debt to American ophthalmology, which I will try to pay by making known among the Spanish-speaking scientists the many talented practitioners of this nation who devote themselves in the right way to the study of diseases of the eye.

In October, 1909, I was agreeably surprised by an invitation from the American Academy of Ophthalmology and Oto-Laryngology to speak at their approaching convention, also gracing me with honorary membership in that body, and extending to me the courtesy of being its guest while the sessions last. I knew that for over three decades and a half I had been a constant laborer in the ophthalmologic field, publishing during that period over four hundred papers on ophthalmic subjects; but as in doing so I was only obeying a natural inclination for the studies to which I had been entirely confined since my youth, I believed that there was nothing extraordinary in my work and felt, therefore, greatly obliged to the American oculists that had so distinguished me, a colleague of a distant locality, the Great Antilles, far removed from the busy scientific centers of the American continent. During the year that has just ended I have begun to pay this debt to American ophthalmologists in my own way, by publishing, after four months spent in New York, two extensive pamphlets detailing the work of those who practice ophthalmology in that great city, and who also excel in ophthalmometry. More recently, in my paper for the second Pan-American Scientific Congress, now being held in Washington, I believe I have shown that the great majority of American operators, in the operation for cataract, without apparent agreement, have derived inspiration from the great work of Daviel—the extraction of cataract—and have equally preserved the memory of von Graefe's genius—the operation for iridectomy. At the same time they have made all possible use of the modern advances of medical science in general; such as those of antisepsis, derived from the development of bacteriology; those of local anesthesia, which facilitate so much the surgical maneuvers; as well as the irrigation of the anterior chamber, the cutting of the conjunctival flap, the improvement of the discission of the capsule, etc. For all these advances to protect the eye against all eventualities after the best operation for cataract, I believe that the most generalized operative procedure in the United States ought to be called, for many reasons, "The American Method for the Extraction of Cataract."

My task in the future, I repeat, will be to become better acquainted every day with the American progress in ophthalmology, in order to write, when the opportunity arrives, the history of ophthalmology in the United States; and, later on, to write in English about the progress attained in the same branch of medicine in Spain and the Spanish-American countries. In this way I shall be able to reciprocate the kindness of which I have been the recipient, which has deeply stirred my gratitude. I will endeavor in time to unite, with the noble and disinterested bond of ophthalmic science, peoples that, although speaking different languages, feel in truth as one through the brotherhood that professions establish among men of pure heart.

Please accept, illustrious colleagues, on this occasion, my most sincere and fondest expression of respect and fraternal affection.

Embolism of Superior and Inferior Retinal Artery.

Dr. Burton Chance reported what he believed to have been a temporary obstruction of the central artery, affecting both the superior and inferior branch—this obstruction having practically disappeared. The patient, a woman of thirty-three years, who had been married eleven years, had come to the hospital on December 2d, with the statement that while going about her household duties on November 27th, and while in the act of sweeping, she had become suddenly blind in her left eye and that since then the degree of blindness had remained unchanged.

When examined the entire retina was edematous and the disc markedly swollen. As the patient was pregnant, at about the fifth or sixth month, and had been unwell in the early weeks of this, her fifth, pregnancy, it was deemed wise to refer her to her family physician, whose report, furnished several days later, was entirely negative as to renal complications.

At the first visit concentrated solutions of magnesium sulphate were ordered, and the bichlorid of mercury in Basham's mixture. At the second visit the patient reported that her urinations had been most copious on the use of these preparations. The fundus showed a remarkable change, the diffuse edema having subsided; but over the areas supplied by the superior and inferior temporal arteries there was a marked ischemia, as depicted in a water color sketch shown by Dr. Chance, which had been made by Miss Washington on the morning after the second visit.

The central vision had been, and still remained, 6/9, but the peripheral field was cut down to a half circle extending to about ten degrees above the horizontal. In the succeeding weeks the ischemia totally subsided. There did not seem to be any marked changes in the vessels when the patient was exhibited, other than their caliber was less than that of vessels in the nasal section. The nervous elements were undoubtedly atrophying. The fundus of the right eye was healthy throughout, the acuity of the vision being at 6/5.

Discussion.—Dr. Zentmayer said that through the courtesy of Dr. Chance, he had seen the patient soon after the onset of the obstruction. He thought it likely, from the history of sudden, almost complete blindness, that at first there had been a trunk thrombus, and it had later broken up, the fragments entering the inferior and superior branches of the central artery.

Microophthalmos.

Dr. Chance then exhibited a girl of nine years whose left eye was microophthalmic and converged upward and inward; also showing a degenerated lens, or what Dr. Chance said was probably only the calcified capsular remnant of a lens, to which were attached three iris bands that he believed to be the remains of the iris membrane. One of these bands, extending from the lower nasal quadrant, was quite vascular, the vessels being continuous with those of the iris; or, rather, running out from the substance of the iris. The vessels were expanded, and appeared quite distinctly on the capsular surface. Light perception was prompt, and there was a good candle field.

The right eye was normal in all respects, except for a low degree of hyperopia, which was corrected to the full standard. The parents, Dr. Chance stated, desired that something might be done to correct the deformity, and that the white pupil might be made black, and had requested that operative measures should be instituted. He considered these requests reasonable enough, and intended to operate upon the lenticular mass during the following week.

Dacryocystitis Benefited by Ethylhydrocuprein.

Dr. William Campbell Posey showed a case of subacute dacryocystitis that had been benefited by the application of one per cent of ethylhydrocuprein into the conjunctival sac, the mucopurulent character of the secretion from the sac disappearing within forty-eight hours after this solution had been used.

Sclerosing Keratitis.

A case of sclerosing keratitis was exhibited by Dr. Posey. This patient had been treated elsewhere, without avail, by electricity, notwithstanding the fact that the tubercular nodules seen in the sclera and cornea were, in Dr. Posey's opinion, most significant of tuberculosis. Tuberculin was administered internally, and a reaction obtained with 1/250 milligram. Under two weeks of gradually increasing doses the eye had cleared markedly.

Delirium Following Operation for Glaucoma.

Dr. William Campbell Posey reported a case of delirium coming on about forty-eight hours after a glaucoma operation —i. e., an iridectomy upon one, and a cyclodialysis upon the other eye. The delirium, which occurred in a neurotic Hebrew woman, assumed a violent character, but was kept in check by bromids and chloral. Dr. Posey thought the delirium similar in every way to that which occurs so often after cataract operations, and pointed out the fallacy of attributing the mental aberration in all cases to the use of atropin; for in this case of glaucoma, no atropin was used. Nor was he inclined to adopt the theory that ascribes the delirium to bandaging the eyes, for he had seen mental symptoms occur after operations in which the eye were not bandaged. He considered the intense preoccupation the chief contributing factor in the production of all forms of neuroses after eye operations.

The Use of Tuberculin in Tuberculous Iritis.

Dr. William Zentmayer showed a patient, aged seventeen years, on whom he had operated for convergent strabismus five years before. There had resulted an orthophoria, with perfect binocular vision.

At that time, he said, there was no evidence of uveitis. The patient stated that in the spring of 1915 the right eye had been inflamed and painful for six weeks. She was not seen until November 18th, when the eye showed the sequelæ of iritis—a small pupil, a posterior synechia, a delicate pupillary membrane, no anterior chamber, and no view of the fundus; tension, minus. The Wassermann test was negative; the von Pirquet, strongly positive. When the initial dose of 1/500 milligram was given, on December 7th, vision was 6/30. By December 30th she had had four doses, each double the preceding one. Her vision, on January 8th, was 6/12 pt. The fundus was visible through a cloudy vitreous. She had also been taking the bichlorid of mercury, grain 1/14, t. i. d. Dr. Zentmayer thought, however, that the tuberculin had been the active therapeutic measure, as he had never seen so great an improvement follow in so short a time the administration of the bichlorid alone.

Motais' Operation.

Dr. William Zentmayer showed an Italian man, aged twenty years, on whom he had performed the Motais operation for unilateral congenital ptosis, six months previously. Although the result was cosmetically excellent, the patient, who is a hat moulder, complained that after working for a few hours the lid would tend to droop sufficiently to interfere with his work.

Iritis Due to Metastatic Gonorrhea.

Dr. How, by invitation, showed a case of iritis due to a metastatic gonorrhea. This case was from Dr. Posey's clinic, the patient being a young man who had had urethritis a year before.

Dr. Posey said that he would rely chiefly upon the salicylats in the internal treatment. He was doubtful as to the value of antigonorrheal vaccins and bacterins, having seen plastic exudation into the anterior chamber follow their use in several cases in which they had been employed in but moderate doses.

Meeting Held February 7, 1916. Dr. McCluney Radcliffe, chairman.

A Case of Mikulicz's Disease.

Dr. William Campbell Posey showed a case of Mikulicz's disease in a colored woman twenty-one years of age, the subject of both tuberculosis and syphilis. Five out of six remaining teeth were decayed and the gums inflamed.

Dr. Posey referred to Dr. Ziegler's monograph upon the subject, and his theory of the nasal origin of the disease with transmission of the infection through the lymphatic capillaries. The young woman referred to was receiving a supportive treatment and, in addition, cod liver oil, iron and mercury.

Discussion.—Dr. Ziegler said that the etiology of Mikulicz's disease was obscure. All examinations had failed to show infection of any kind. The disease had, he stated, been observed to subside in the presence of some intercurrent infection, with a recrudescence after the secondary disease had been cured. He thought it was due to a lymphoneurosis of an obscure type. The cases he had observed were all improved by increasing the process of oxidation. The disease is not confined to any one country or race.

Dr. Zentmayer called attention to the very marked drooping of the outer half of the upper lid, giving rise to an appearance that had been so well described in Dr. Ziegler's paper as the "bloodhound eye."

Ulcer of the Cornea Treated by the Desiccation Method.

Dr. William Campbell Posey showed a case of epithelial infiltration of the cornea, of traumatic origin, resembling, in many ways, the disciform keratitis of Fuchs, which had shown marked and rapid improvement under one application of the desiccation method of Clark. He said that such cases, in which the terminal nerve filaments had doubtless suffered trophic changes in consequence of injury, resisted treatment, as a rule; and he was convinced that the electricity had shortened the healing process very markedly.

Melanosarcoma of the Conjunctiva.

Dr. Posey also showed a case of melanosarcoma of the conjunctiva, in its second recurrence, which had also been greatly and rapidly alleviated by desiccation treatment. The sarcoma, which was diffuse and had invaded the bulbar conjunctiva chiefly in its upper and inner and its lower and outer segments, had been primarily removed ten years before. A second operation had been performed for recurrence five years later. The second recurrence was characterized by a general diffuse infiltration of the sarcomatous mass through the conjunctiva, in the regions referred to, and some superficial involvement of the cornea. The swelling and irritation caused by the sarcoma, and much of the pigmentation, disappeared two weeks after electricity had been applied.

Metastatic Gonorrheal Iritis.

Dr. Posey showed two men with binocular iritis, due to metastatic gonorrhea: the first, in a man fifty-five years of age, five years after the urethritis had been contracted; the second, in a man twenty-five years of age, one year after his local infection. In both cases there had been an extensive extravasation of lymph into the anterior chamber. Both resisted treatment until a paracentesis of the anterior chamber was performed, following which, tension, which had been high, was lowered, and a marked amelioration of the inflammatory symptoms took place. Dr. Posey agreed with the view that is now held by genitourinary surgeons, that gonorrheal bacterins are of no service in the treatment of iritis due to metastatic gonorrheal rheumatism.

Embolism of the Central Artery of the Retina.

Dr. P. L. Balentine presented this case because of the interesting condition of the blood vessels. The patient gave a history of previous attacks of fever, and a cardiac examination revealed an aortic stenosis with a mitral regurgitation. When first examined, in addition to the usual signs of obstruction of the central artery, the blood in those arteries which were not entirely empty was broken up into small, regular sections, with spaces between. The whole beadlike column moved in an irregular, jerky fashion towards the disc, instead of towards the periphery.

Discussion.—Dr. Zentmayer said that the beaded or broken-up column of blood appearing in the arteries in some of these cases could be explained by the fact that at the systole of the heart a small amount of blood is forced by the obstruction, and that immediately following this the vessel collapses under the pressure of the intraocular tension, this occasioning a clear space. Then with the next contraction of the heart another small quantity of blood is forced into the artery; and again, during diastole, the vessel collapses, thus forming an alternation of a segment of blood with a clear space, the whole circulating very slowly.

Dr. Griscom thought that the reversed flow of the arterial current was of unusual interest, and recalled having seen the same condition in a case of embolism of the central artery presented to the society by Dr. D. F. Harbridge several years ago.

Subconjunctival Dislocation of the Lens.

Dr. William Zentmayer presented a woman, sixty-one years old, who had been struck over the lower lid by a piece of wood one week previously. The lower lid of the left eye was slightly ecchymosed, and there was a subconjunctival hemorrhage below the cornea. There was a horizontal groove across the upper field of the cornea, produced by a bulging forward of the portion of the structure above this. When the eye was rotated downward and the upper lid elevated, there came into view a translucent, hemispheric mass, the lower border of which reached almost to the upper margin of the cornea. The overlying conjunctival vessels were congested. No view of the fundus was obtainable, owing to intraocular hemorrhages.

Dr. Zentmayer purposed to remove the lens after a plan used recently by Krause. In this procedure a purse-string suture is first passed through the conjunctiva about the base of the swelling. This is gradually drawn upon, after an incision has been made through the overlying conjunctiva, the lens being thus extruded, and the scleral rupture covered simultaneously. This operation was done on the following day. After expulsion of the lens a rupture of the sclera was found, about one centimeter in length, and parallel to and about two millimeters from the corneal margin. The rupture, Dr. Zentmayer stated, usually occurs over the sclerocorneal limbus, as this is the weakest part of the outer tunic of the eye. It is in this position that is found the canal of Schlemm, with the weak pectinate ligament forming its outer wall. A further weakening is caused by the perforating vessels.

Discussion.—Dr. Chance said that he could not recollect having seen more than one other case, that which he had seen in Dr. Oliver's service while resident physician in the hospital. It was that of an aged farmer, who had been horned by a cow. In appearance the condition was startling; and Dr. Chance was then filled with wonder as to how such an accident could have occurred. He still wonders how it is that with such a blow as can dislocate the lens beneath the bulbar conjunctiva, the eyeball itself is saved from laceration, if not complete destruction. He believed that in that case the lens occupied a position below the cornea, and not above, as in Dr. Zentmayer's.

The Ocular Aspect of Leprosy.

Dr. Burton Chance read a paper detailing the ocular relations of leprosy. After a brief historic sketch of the disease, he spoke of its geographic distribution, and then described the affection in its general aspect, before treating of its manifestations within the ocular structures. He stated that leprosy of the eye is always a matter of secondary invasion, and that it is rare to find a long existent case that has not at some time shown affection of the eye or of its appendages. The statistics of different observers, he continued, vary, both as to the types of the disease and as to the character of the endemic prevalent in their different countries. Borthen, in Norway, found the eyes affected in seventy-five per cent of maculo anesthetica and in ninety per cent of those of lepra tuberosa; while de Silva, in Siam, out of five hundred cases saw one hundred and one.

Besides the lids and brows, all structures of the eye have been found affected; but bacilli have not been discovered in the lens, nor true leprous processes active in the optic nerve. The disease is largely limited to the anterior segment, the ciliary region being especially susceptible. Nodules have been found on the cornea and on the iris, as well as in the ciliary body.

Keratitis, both superficial and deep, chronic and unrelenting, attacks the cornea; while abscess and ulceration supervene from tarsal and conjunctival disease. Frightful destruction and distortion ensue from the effects upon the lids and the bulb.

The disease is due to the lepra bacillus, discovered by Hansen, a bacillus that greatly resembles the tubercle bacillus in appearance; but, so far, it has not been found to be inoculable in man. It may be scattered throughout the system, but is rarely discovered in the blood, although it is probably carried by the blood and lymph streams. The incidence of ocular symptoms bears no relation to the duration of the general disease, but may come on at any time in its course; although it is not usually found until several years have passed. The disease sometimes seems to have "burnt itself out," and the patient then suffers from the effects of the malady. Tubercular leprosy is more disastrous than the other forms; although the anesthetic, if it continues to exist, is followed by blindness.

By most leprologists the influence of the contagion is considered to be as small as that of tuberculosis, or even smaller. While the exact method of inoculation is not known, it seems not unlikely that it may be by the mucous membrane of the mouth, nose and conjunctiva. It is well, therefore, for patients to prevent its spread by contamination from fingers, towels, cloths, etc.

There are no specific remedies, and the ocular lesions are to be managed upon general ophthalmologic principles. Certain observers, having in mind the fact that the bacilli do not penetrate scar tissue, have boldly scarified the pericorneal zone, to prevent an invasion of the cilary region. Nodules may be excised, and much, it is believed, may be done by means of the X-ray and other radiant agents. It is hoped that a serum available for both prophylaxis and cure may be discovered, for it cannot be denied that leprosy is susceptible of arrest and cure.

The Uses of the Desiccation Method in Ophthalmology—A Report of Cases Treated From the Clinics of the Wills Eye Hospital.

Dr. William L. Clark said that the desiccation method had been found useful in treating growths of the lids, canthi and conjunctiva. Among the cases treated were epithelioma, round cell and melanotic sarcoma, xanthoma, warts and moles, corneal ulcer, pterygium, granular conjunctivitis and corneal opacity. Dr. Clark explained that since epitheliomata of the lids and canthi are usually of the basal cell type, are slow of progression, and seldom metastasize, they may be treated more conservatively than those of the prickle or cuboid cell types, which progress rapidly and metastasize early. By the desiccation method these lesions may be successfully treated, with superior cosmetic results. Should there be a recurrence, a second treatment may be applied without great disadvantage to the patient; but this seldom occurs if the epithelioma is localized.

Fourteen cases of epithelioma from Wills Hospital had been treated by this method, Dr. Clark stated. Eight had not recurred in periods extending from four months to two years, after one application. Two cases recurred and were controlled by a second application. Two were very advanced, and the result was only palliative. Two were still under treatment at the time of the report, not being yet healed.

Two cases of round cell sarcoma of the lids, both recurring after excision, had been treated. One recurred in nine months after the desiccation treatment, and was then under treatment again. There had been no recurrence, four months after treatment, in the other case.

Four melanotic sarcomas, involving the cornea, the limbus, and the bulbar and palpebral conjunctiva, were treated. One had not recurred in seven months, and another in three months. The other two had been but recently treated, and were still under observation.

Three cases of xanthelasma, a total of nine lesions, were treated successfully, with excellent cosmetic results. Two cases of warts and moles of the lids, a total of eight lesions, were likewise successfully treated.

One chronic corneal ulcer, which had resisted other methods of treatment, showed a marked and rapid improvement with one desiccation treatment.

Two cases of granular conjunctivitis were treated with success with one application of desiccation.

Two corneal opacities were treated. In one the sight was distinctly improved. In the other, sufficient time had not elapsed to determine the result.

Dr. Clark considered the advantage of the method to be that local anesthesia could be used, that large or small areas could be destroyed, that the cornea might be treated safely, and that no contracted cicatrix followed.

J. MILTON GRISCOM,
Secretary.

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F. L. Rogers, M. D.

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XX.

INTRADURAL TUMOR OF THE OPTIC NERVE.*

E. C. Ellett, B. A., M. D.,

Memphis.

A. A., a negro girl, aged three years, was admitted to my service in the Memphis City Hospital, March 13, 1915, on account of unilateral exophthalmos affecting the right eye. The family history presented no points that would seem to have any bearing on the patient's present condition, and there was no tendency to tumors of any sort in any of the child's antecedents. The present condition was of a few months' duration and of gradual onset, being attributed by the parents to a blow on the eye which the child received by stepping on a hoop lying on the ground so that it flew up and struck the region of the eye. As there was no evidence of any cut on the eye or neighboring skin, it is doubtful if this injury was sufficiently serious to cause any trouble.

The only thing apparently wrong was the proptosis above mentioned; this was quite marked and measured twenty-one millimeters with the exophthalmometer as compared with eleven millimeters in the other eye. Besides protruding forward the eye was pressed a little downward, and while motion laterally was well preserved, vertical motion was entirely lost. The pupil was slightly dilated and did not respond to light. Externally the eye was entirely normal, as were the conjunctiva and lids. No evidence of light perception could be elicited, and several examinations by myself and my associates led us to conclude that the eye was blind. Nothing could be felt in the orbit by palpation, and on account of the proptosis and the fact that the tissues were quite soft, this manipulation was easily and satisfactorily carried out. The eye ground was normal, and especial mention should be made of the fact that the nerve head was normal in appearance. Roentgen ray examinations and careful examinations of the nose by Dr. McKinney of the hospital staff were all negative, as was the general physical examination, urine and blood.

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*Read before the American Academy of Ophthalmology and Otolaryngology, Chicago, Illinois, October 5, 1915.

In discussing the case in clinic, the different causes of exophthalmos were mentioned, and by exclusion it was thought to be a case of some sort of orbital tumor, and probably a tumor of the optic nerve. Enucleation of the eye and tumor was done under general anesthesia March 31st, the operation consuming twenty minutes.

As soon as the muscles were divided and the nerve located, it was seen that this structure was materially enlarged, and in following it backward, the enlargement persisted until the optic foramen was reached. The nerve was cut level with the foramen, and apparently the intracanalicular part of the nerve was affected by the same process which caused the enlargement of the orbital portion. Recovery was uneventful.

The enlargement of the nerve affected the whole of the orbital portion, as seen in the photograph. The enlargement measured nearly three centimeters in length and one-half centimeter in thickness. It was hardened in formalin and imbedded in paraffin and cut. The following report was made by Dr. H. T. Brooks:

"Microscopic study of specimen of tissue from tumor of optic nerve showed the following histologic structure:

"The principal finding was a hyperplasia of tissue resembling —by the use of ordinary stains—connective tissue. This increase was present in and about epineurium, perineurium and, to a less extent in the endoneurium. In other words, it was general throughout the portion of nerve trunk examined, and not localized.

"By the use of selective stains this hyperplastic tissue proved to be glia tissue, chiefly neuroglia fibrils with relatively few glia cells. Diagnosis: Glioma, or a gliosis of the optic nerve.

"In this specimen the excess of neuroglia fibrils and relatively few neuroglia cells speaks for very slow growth. It is, therefore, in my opinion, not malignant.

"In order to determine absolutely the character of this hyperplastic tissue, the following specific stains were employed:

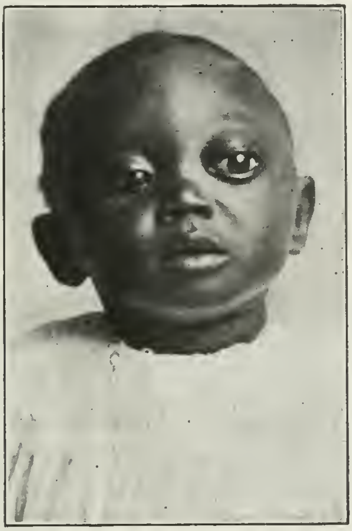

Fig. 1.—The patient, showing unilateral exophthalmus.

"1. Van Gieson's stain for connective tissue.
"2. Mallory's anilin blue stain.
"3. Phosphotungstic acid hematoxylin for neuroglia fibrils.

VAN GIESON'S STAIN.

"With this the connective tissue fibrils appear red or reddish brown. Neuroglia fibrils and muscle tissue appear yellow. This is not, however, a specific stain for neuroglia tissue but only connective tissue. This stain showed the major part of the hyperplastic tissue not to be connective tissue.

MALLORY'S ANILIN BLUE STAIN.

"With this stain connective tissue appears blue, while the neuroglia fibrils appear red or light red. The blue shown in the specimen represents the normal connective tissue framework found in all nerve trunks, while the red or light red tissue is glia tissue. Practically all of this hyperplastic tissue takes this red or light red stain.

PHOSPHOTUNGSTIC ACID HEMATOXYLIN STAIN.

"With this stain connective tissue appears red or reddish brown while glia tissue appears blue. Therefore the reddish brown areas shown in this specimen represent the normal connective tissue framework of the nerve trunk, while the blue tissue is glia tissue. Practically all the hyperplastic tissue in this specimen takes this character of stain."

Very full consideration of intradural tumors of the optic nerve can be found in Byers' monograph and in his paper read before the Section on Ophthalmology of the American Medical Association in 1914, and in Parsons' "Pathology of the Eye." Most of the published cases are characterized by an overgrowth of the fibrous elements, to which Byers gives the name "fibromatosis." Parsons endorses the name as well as the suggestion that the cause of this overgrowth is in an obstruction to the normal lymphatic circulation. In the case here reported, the tissue affected is plainly shown by differential staining to be the neuroglia.

Clinical features of this condition to which attention might be called, are the early age of its incidence (Parsons thinks they are probably congenital), the slow growth, slight malignancy and absence of metastases. According to Byers, the intracranial prolongation of the disease is usual.

Nothing can be done in the way of treatment except removal of the tumor, which often means removal of the eye as well. An attempt to remove the tumor alone can be made by means of the Kronlein operation, or what Byers advises, the Knapp operation, of removal through a conjunctival incision, with canthotomy and temporary division of the rectus externus.

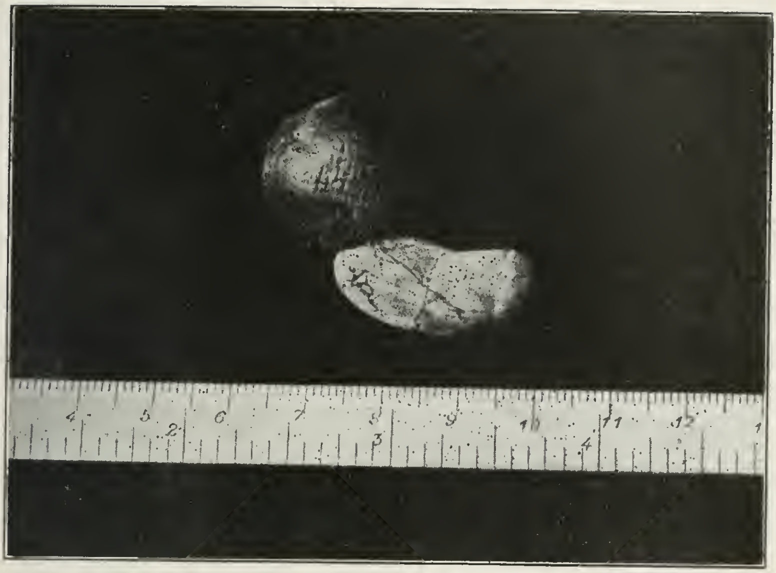

Fig. 2.—The tumor and eyeball.

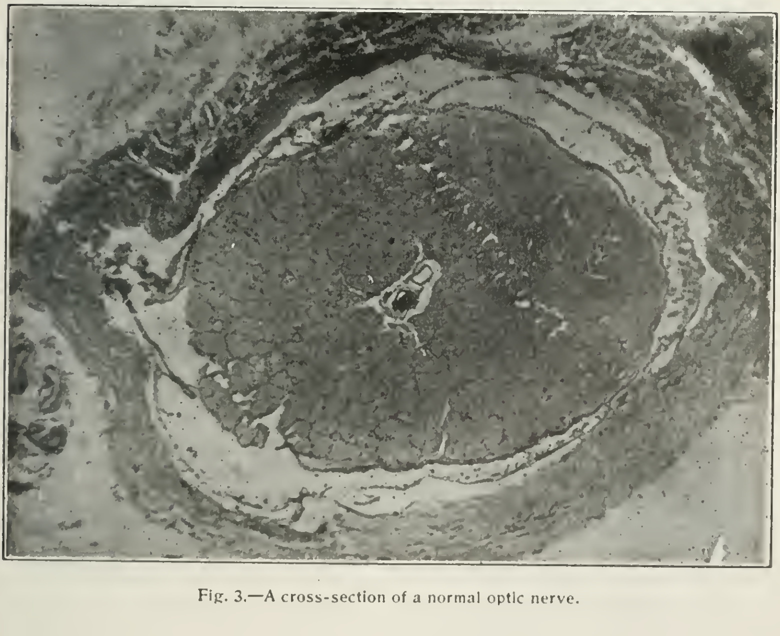

Fig. 3.—A cross-section of a normal optic nerve.

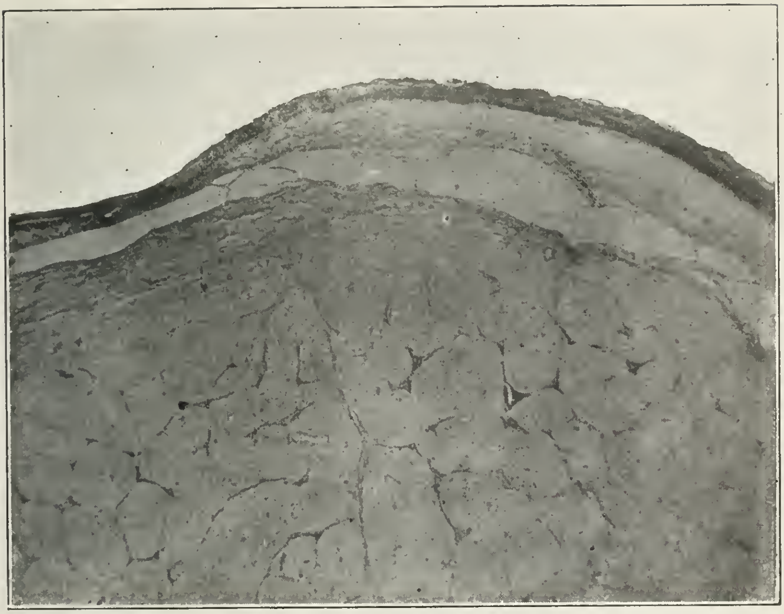

Fig. 4.—A cross-section of the nerve in the case reported under same magnification as No. 3.

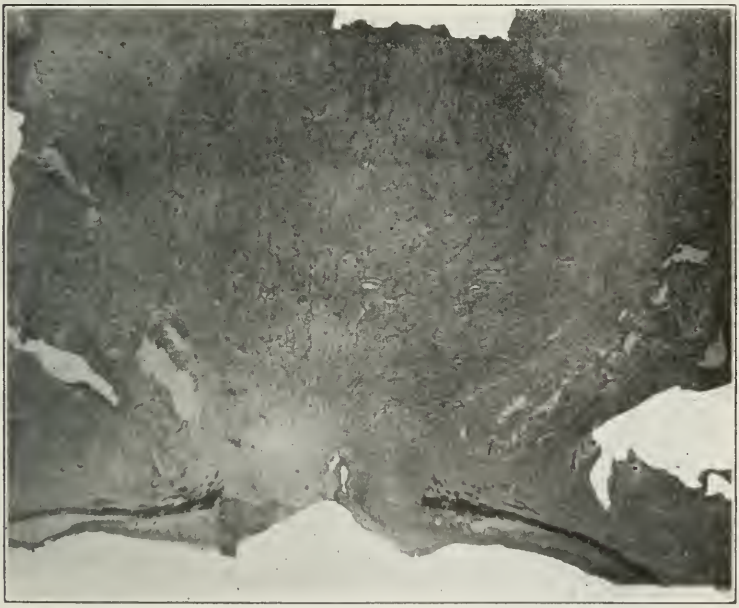

Fig. 5.—A section showing the entrance of the nerve into the eyeball. The papilla is not involved.

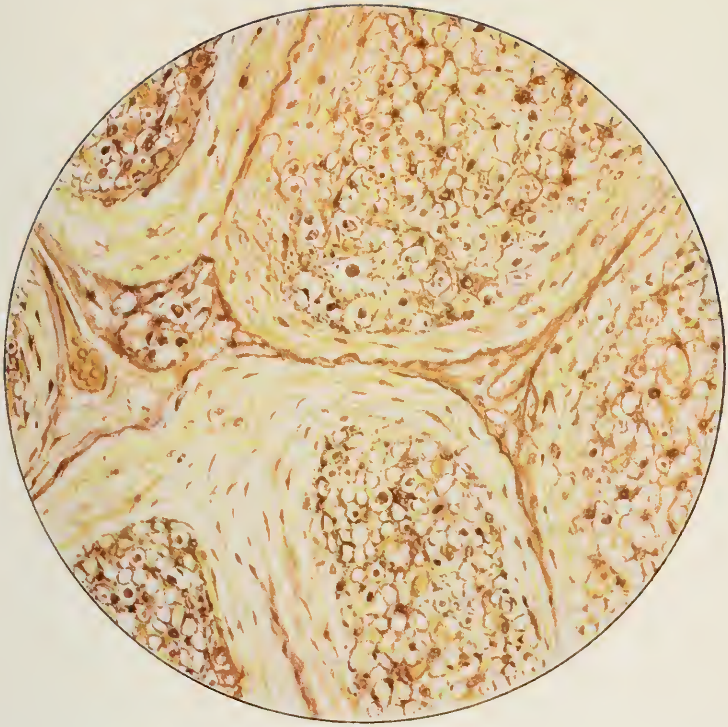

Fig. 6.—Van Gieson's Stain. With this connective tissue fibrils appear red or reddish brown. Neuroglia fibrils and muscle tissue appear yellow. This is not, however, a specific stain for neuroglia tissue, but only connective tissue. This stain showed the major part of the hyperplastic tissue not to be connective tissue.

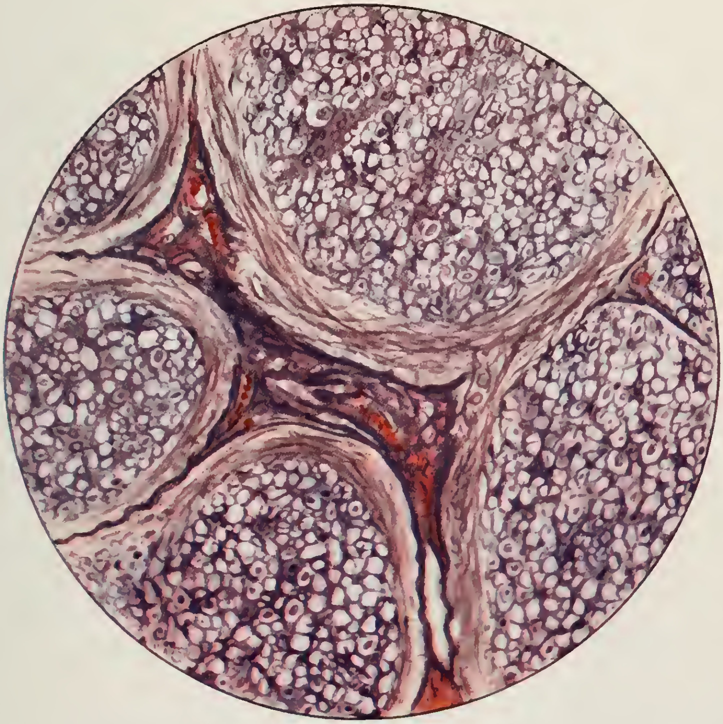

Fig. 7.—Mallory's Aniline Blue Stain. With this stain connective tissue appears blue, while the neuroglia fibrils appear red or light red. The blue shown in the specimen represents the normal connective tissue framework found in all nerve trunks, while the red or light red tissue is glia tissue. Practically all of this hyperplastic tissue takes this red or light red stain.

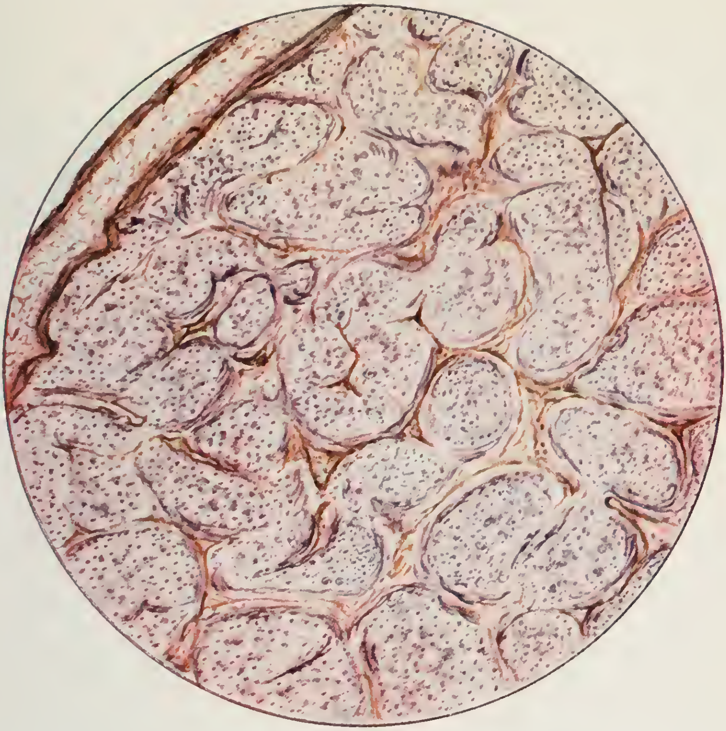

Fig. 8.—Phosphotungstic Acid Hematoxylin Stain. With this stain connective tissue appears red or reddish brown, while glia tissue appears blue. Therefore, the reddish brown areas shown in this specimen represent the normal connective tissue framework of the nerve trunk, while the blue tissue is glia tissue. Practically all the hyperplastic tissue in this specimen takes this character of stain.

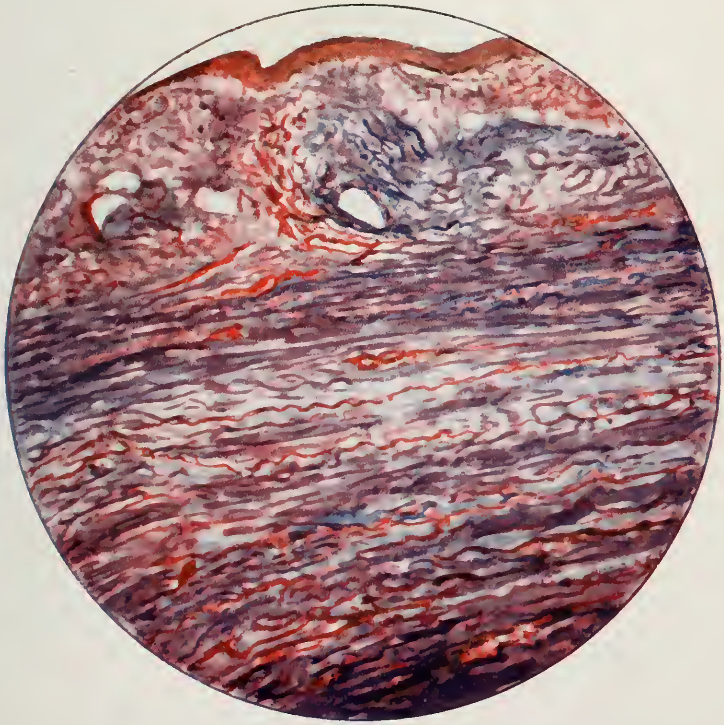

Fig. 9.—Phosphotungstic Acid Hematoxylin Stain. With this stain connective tissue appears red or reddish brown, while glia tissue appears blue. Therefore, the reddish brown areas shown in this specimen represent the normal connective tissue framework of the nerve trunk, while the blue tissue is glia tissue. Practically all the hyperplastic tissue in this specimen takes this character of stain.

XXI.

A RÉSUMÉ OF EXPERIMENTS ON THE EFFECT OF DIFFERENT CONDITIONS OF LIGHTING ON THE EYE.

C. E. Ferree, Ph. D., and G. Rand, Ph. D.,

Bryn Mawr College.

The work of which this paper is a brief outline was done under the auspices of the American Medical Association's subcommittee on the Hygiene of the Eye, of which Dr. William Campbell Posey of Philadelphia is chairman, and has been in progress five years. The object of the work has been to compare the effect of different lighting conditions on the eye and to find the factors in a lighting situation which cause the eye to lose in efficiency and to experience discomfort.

Confronting the problem of the effect of different lighting conditions on the eye, it is obvious that the first step towards systematic work is to obtain some means of estimating effect. The prominent effects of bad lighting systems are loss of efficiency, temporary and progressive, and eye discomfort. Three classes of effect, however, may be investigated: (1) The effect on the general level or scale of efficiency for the fresh eye; (2) loss of efficiency as the result of a period of work; and (3) the tendency to produce discomfort. A description of tests designed especially for the investigation of these effects has already appeared in print.[1] Some of these tests have been designed to determine the eye's aggregate loss in functional power, others to aid in the analysis of this effect. Space can be taken here for the mention only of the one with which the greater part of the work was done—namely, a test for determining the power of the eye to sustain clear seeing. Just two principles are involved in this test. One is that visual acuity or clearness of seeing may be measured by the smallest visual angle the eye is able to discriminate;

the other, a principle equally old, is that a loss of efficiency in a machine, apparatus, or a living organ or organism will show out more plainly when a prolonged rather than a momentary performance is required. These principles have been combined in their simplest terms into a test of the comparative ability of the eye to maintain its power of clear seeing or aggregate functional activity under different conditions of lighting and under different kinds and conditions of use. In operation the test method may be described briefly as follows: The power of the eye to sustain a certain standard of acuity for three minutes is measured before and after a period of reading from uniform type and paper under the lighting conditions to be tested. That is, by means of a visual acuity test object with the proper auxiliary apparatus and a kymograph and a chronograph, records are made of the time the eye can be held up to this standard of performance and the time it drops below. The ratio of these quantities to each other or to the total time for which the record was made is taken as the measure of the ability of the eye to sustain its power of clear seeing before and after work under the lighting conditions to be tested.

The following aspects of lighting sustain an important relation to the eye: The evenness of illumination, the diffuseness of light, the angle at which the light falls on the object viewed, the evenness of surface brightness, intensity, and quality, or color value of the light. The first four of these factors, which may be grouped together as distribution factors, will be discussed briefly with reference to types of lighting now in common use.

The ideal condition with regard to the distribution factors, so far as the functional welfare of the eye is concerned, is to have the field of vision uniformly illuminated with light well diffused and no extremes of surface brightness. When this condition is attained the illumination of the retina will shade off more or less gradually from center to periphery, which gradation is necessary for accurate and comfortable fixation and accommodation. In the proper illumination of a room by daylight we have been able thus far to get the best control of the distribution factors. Before it reaches our windows or skylights, daylight has been rendered widely diffuse by innumerable reflections; and the windows and skylights themselves, acting as sources, have a broad area and low intrinsic brilliancy, all of which features contribute towards giving the ideal conditions of distribution stated above. Of the systems of artificial lighting, the best control of the distribution factors, speaking in general terms, is given by the indirect systems, and the semiindirect systems with a small direct component of light. In the indirect systems the source is concealed from the eye and the light is thrown against the ceiling or some other diffusely reflecting surface in such a way that it suffers one or more reflections before it reaches the eye. When properly installed the use of these reflectors introduces no extremes of surface brightness in the field of view greater than that which the eye is prepared to stand without a significant depression of functional power. Moreover, the brightest spots are on the ceiling and are, therefore, in rooms of ordinary height, pretty well removed from the zone of most harmful influence on the eye. The direct lighting systems are designed to send the light directly to the plane of work. There is in general in the use of these systems a tendency to concentrate the light on the working plane or object viewed rather than to scatter it in all directions, and therefore a tendency, especially with some types and kinds of installation, to create brightness differences in the field of view rather than to level them down. Much can be done to ameliorate this tendency, however, in constructing the reflector and grading its density and in choosing the height of installation above the working plane. Too often, too, the eye is not shielded properly from the light source, and frequently no effort at all is made to do this, although such practice is now strongly condemned by the lighting engineer. How to retain as much as possible of the superior physical efficiency of direct lighting and at the same time to protect the eye from the harmful effects of badly controlled distribution factors, more especially from the glare of poorly concealed sources, the excessive brilliancy presented by the surfaces of reflectors of low density and by the openings of reflectors of high density, etc., is one of the most interesting and difficult problems presented to the workers in this field at the present time. The semiindirect reflectors are intended to represent a compromise between the direct and indirect reflectors. A part of the light is transmitted to the plane of work through the translucent reflector placed directly beneath the source of light, and a part is reflected to the ceiling. Thus, depending on the density of the reflector, this type of lighting may vary between the totally direct and the totally indirect, and share in the respective merits and demerits of each in proportion to its place in the scale. By giving a better control of what we have called the distribution factors, this type of lighting is supposed also to be a concession to the welfare and comfort of the eye, and so it is in reflectors of high density. Our tests, however, show that the concession is not nearly so great as it was supposed to be in case of reflectors of low and medium density. In fact, installed at the intensity of illumination ordinarily used or at an intensity great enough for all kinds of work, little advantage seems to be gained for the eye for reflectors of low and medium density; for with these intensities of light and densities of reflector the brightness of the source has not been sufficiently reduced to give much relief to the suffering eye. Until this is done in home, office and public lighting, we cannot hope to get rid of eye strain with its complex train of physical and mental disturbances. Moreover, the principles in accord with which the installation is made require that the reflector be brought further into the field of vision than is the case, for example, when a direct reflector is used. On this account a worse result is apt to be obtained with semiindirect reflectors of low and medium density than even with equally well designed direct reflectors of the same density.

In the experimental work the following points have been covered: The effect of varying the distribution factors on the ability of the eye to maintain its maximal efficiency for a period of work; the effect of varying the intensity of light with various groupings of distribution factors; and certain miscellaneous experiments relating to the hygienic employment of the eye. These latter experiments include the effect of varying the area, and conversely the intrinsic brightness of the ceiling spots above the reflectors in an indirect system of lighting; the effect of varying the angle at which the light falls on the work in a given lighting situation; the effect of using an opaque eye shade with light and dark linings with each of the lighting installations used in the distribution and intensity series; the effect on the efficiency of the fixation muscles of a period of work under each of these installations; the effect of motion pictures on the eye at different distances from the projection screen; and a determination of the tendency of each of the conditions of lighting employed to produce discomfort and a comparison of the tendency to produce discomfort and to cause loss of efficiency.

The investigations were not abstract in character. All the variations obtained were gotten in actual concrete lighting situations by employing lighting installations in common use. In order that a correlation might be made between lighting conditions and the effect on the eye, the following specification of illumination effects was made in each case:

(1) A determination was made of the average illumination of the room under each of the installations of lighting used. The room was laid out into three-foot squares and illumination measurements were made at sixty-six of the intersections of these squares and at the point of work. Readings were taken in a plane one hundred and twenty-two centimeters above the floor with the receiving test plate of the illuminometer in the horizontal, the forty-five degree and the ninety degree positions, measuring respectively the vertical, the horizontal, and the forty-five degree components of illumination. The one hundred and twenty-two centimeter plane was chosen because that was the height of the test object. In the work on the distribution series the illumination was made as nearly as possible equal to the point of work.

(2) A determination was made in candle power per square inch of the brightness of prominent objects in the room, such as the test surface, the reflectors for the semiindirect installation, the reflectors and filament for the direct installation, the reading page, the specular reflection from surfaces, etc. The brightness measurements were made by means of a Sharp-Millar illuminometer with the test plate removed. The instrument was calibrated against a magnesium oxid surface obtained by depositing the oxid from the burning metal. By this method the reflecting surfaces were used as detached test plates. The readings were converted into candle power per square inch by the following formula: Brightness = $\frac{\text{Foot-candles.}}{\text{II x 144.}}$

(3) Photographs were made of the room from three positions under each system of illumination.

In the selection and use of observers for the work the following are some of the precautions that were taken: Care was exercised, in the first place, to choose only those who had shown already a satisfactory degree of precision in other work in physiologic optics and whose clinic record showed no uncorrected defects of consequence. All were under thirty years of age. Before being allowed to take part in the actual work of testing, each observer was trained to a satisfactory degree of precision in the three minute record under a given lighting condition, and in the three hour test under several of the conditions to be tested. In the actual work of testing the results were compiled from several observations, and the precision was checked up by the size of the mean variation. No results were accepted as significant unless the variation produced by changing the condition to be tested was largely in excess of the mean variation or mean error for each condition tested. This, the accepted conventional check on the influence of variable extraneous factors, was carefully applied at each step in the work. The following results were obtained:

(1) Of the lighting factors that influence the welfare of the eye, those we have grouped under the heading of distribution are apparently fundamental. They seem to be the most important we have yet to deal with in our search for the conditions that give us the minimum loss of efficiency and the maximum comfort in seeing. If, for example, the light is well distributed in the field of vision and diffuse, and there are no extremes of surface brightness, our tests indicate that the eye, so far as the problem of lighting is concerned, is practically independent of intensity. That is, when the proper distribution effects are obtained, intensities high enough to give the maximum discrimination of detail may be employed without causing appreciable damage or discomfort to the eye.

(2) For the control of distribution effects given by the semi-indirect reflectors of low and medium density and the direct reflectors presenting, as most of them do, excessive brilliancies due to opening, surface of reflector, or a wholly or partially exposed source, our results show unquestionably that too much light is being used in ordinary work for the comfort and welfare of the eye. That is, with these reflectors means have not

yet been found of producing this amount of light without introducing harmful brilliancies into the field of vision.

(3) The angle at which the light falls on the object viewed is an important factor, but not nearly so important, for example, as evenness of surface brightness in the field of vision. Extremes of surface brightness in the field of vision seem, in fact, to be the most important cause of the eye's discomfort and loss of efficiency in lighting systems as we have them at the present time. In lighting from exposed sources it is not infrequent to find the brightest surface from one million to two and one-half million times as brilliant as the darkest; and from three hundred thousand to six hundred thousand times as brilliant as the reading page. These extremes of brightness in the field of vision are, our tests show, very fatiguing to the eye.

(4) Of the systems of artificial lighting tested thus far, the best results have been obtained for the indirect systems, and the semiindirect systems with reflectors having a high density. By means of these reflectors the light is well distributed in the field of vision, and extremes of surface brilliancy are kept within the limits which the eyes are prepared to stand. A great deal of loss of efficiency has been found to result from the use of semiindirect reflectors of low and medium density, and from the use of direct reflectors, especially those of shallow and medium depth. With regard to the degree of density that is most favorable for the eye, the direct reflectors seem, however, to present a special case. With reflectors of medium depth our best results have been gotten so far with reflectors of medium density. This, however, is not in contradiction to our principle that extremes of brightness are fatiguing to the eye. For in case of the denser reflectors the ceiling and the reflectors are dark, while standing out in sharp contrast to them is the bright opening of the reflector. Moreover, if the physical efficiency of the reflector is not to be lowered by increasing its density, its opening must become lighter in some proportion to the increase of density, for in a totally opaque reflector all, and in the denser reflectors nearly all, of the light sent to the working plane must come from this opening. In the reflectors of medium density, however, the opening need not have such a high brilliancy, and there is little contrast

between it and its surroundings. When installed on or near the ceiling in rooms of moderate height, the best results seem to be obtained when the opening, the surface of the reflector, and the ceiling have as nearly as possible an equal brilliancy. It seems probable that the effect on the eye of the denser reflectors can be very much improved by increasing the depth of the reflector and by other devices that will lower the brilliancy of the opening.

(5) The problem of installing is not the same for the semiindirect as for the totally indirect reflector. In the latter case the height should be so adjusted as to give as nearly as possible an even distribution of surface brightness on the ceiling and evenness of illumination on the working plane. In the case of semiindirect reflectors, especially those of medium densities, and in rooms of the height ordinarily found in dwelling houses, if the distance from the ceiling is made great enough to produce these effects, the bright reflectors are dropped too low in the field of vision for the highest comfort and efficiency of the eye. Apparently the denser they are the more nearly they can afford to be installed as indirect reflectors, and the less dense they are the more nearly they should be installed as direct reflectors, so far as eye effects of the kind revealed by our tests are concerned. In this connection it may be pointed out that in current practice direct reflectors for general illumination are usually installed on the ceiling or as near to it as is possible, especially in rooms of low or medium height.

(6) In the work of providing general illumination the most difficult feature presented in the problem of protecting the eye is encountered in the lighting of rooms of low and medium height. The difficulty decreases with increase of the height of the ceiling. In rooms whose ceilings are very high in proportion to the other dimensions of the room, it seems safe to say that comparatively good results should be gotten with almost any reflector of modern design; for it is much easier in such rooms to get the bright sources of light, primary and secondary, out of the zone of most harmful influence on the eye.

(7) The loss of efficiency sustained by the eye in an unfavorable lighting situation seems to be muscular, not retinal. The retina has been found to lose little, if any, more in effi-

ciency under one than under another of the lighting systems employed (tested by power to discriminate color and brightness, lag of sensation, rate of exhaustion and rate of recovery).

(8) Eye shades are apparently not an adequate substitute for lamp shades for the protection of the eye from the source of light. The best results were gotten by means of an opaque eye shade with a light lining. The usual opaque eye shades with a dark lining, while they shield the eye from the source of light, do not by any means eliminate harmful brightness differences in the field of vision. They in fact create for the eye a very unnatural brightness relation—i. e., they make the whole upper half of the field of vision dark, in sharp contrast with the brightly lighted lower half. The direct effect of this is a strong brightness induction (physiologic) over the lower half of the field of vision which causes glare in surfaces which have no glare and increases the glare in surfaces in which glare is already present. Moreover, the unusual and strongly irregular character of the image formed on the retina probably also sets up warfare in the incentives given to the muscles which adjust the eye—that is, the upper half of the field of vision is dark and presents no detail. The effect of this is probably to exert a tendency to cause the muscular relaxation characteristic of the darkened field of vision. The lower half of the field of vision is light and filled with detail. The incentive here is for the best possible adjustment of the eye for the discrimination of detail in the object viewed, while the rim of the shade, the sharply marked boundary between the light and dark halves of the field of vision and much nearer to the eye than the objects viewed, serves as a constant and consciously annoying distraction to fixation and accommodation. These complex and somewhat contradictory impulses given to the muscles of the eye might very well, and doubtless do, cause an excessive and unnatural loss of energy and efficiency in case of the prolonged adjustment needed for a period of work. Translucent shades, when made sufficiently opaque to give the necessary reduction to the image of the source, darken too much the upper half of the field of vision and simulate thereby too much the effect given by the opaque shade with the dark lining to give the best results for efficient and comfortable seeing.

(9) The observation of motion pictures for two or more hours causes the eye to lose heavily in efficiency. The loss decreases rather regularly with the increase of distance from the projection screen. It seems little if any greater, however, than the loss caused by an equal period of working under much of the artificial lighting now in actual use. In making these tests care was taken to choose a projection apparatus which gave a picture comparatively steady and free from flicker.

(10) In all the conditions tested a rather close correlation is found to obtain between the tendency of a given lighting condition to cause loss of visual efficiency and to produce ocular discomfort. The tendency to produce ocular discomfort was estimated by the time required for just noticeable discomfort to bet set up with the eye both working and at rest under the conditions to be tested. The results of this work were also carefully checked up by the determination of the mean variation.

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XXII.

SPONTANEOUS ABSORPTION OF OPACITIES IN THE CRYSTALLIN LENS.*

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Under this heading cases have been reported, from time to time, and occasionally complete bibliographic articles have been written, covering this entire subject. The reporting of this particular case, and the allied cases following it, is prompted by the recent circumstance of a well known Philadelphia financier regaining his sight at the hands of an osteopath, as he alleges, after his condition had been diagnosed as cataract by two reputable ophthalmologists, and being advised to consider operation ultimately.

The case history of my patient reads: J. D., fifty-seven years of age, musician and church organist by occupation, referred by Dr. Leon Brinkman of Philadelphia, on account of failing vision, monocular diplopia, and annoying subjective color phenomena. The vision in right eye was 5/22.5, and in left eye, 5/12, with pronounced recession of the near point in both eyes. The vision, from his standpoint, was so far impaired that he could not perform his daily routine with any degree of satisfaction or accuracy.

Detailed examination at this time, with the pupils dilated by a drop of euphthalmin solution, showed the lids, conjunctiva, lacrimal apparatus, and extraocular muscles to be normal. The cornea was clear, the tension normal, the anterior chamber of average depth in both eyes. Prior to the instillation of the mydriatic the reactions of the pupils to the ordinary stimuli of light, accommodation and convergence were normal, prompt and free. The mydriatic caused almost complete dilatation of both pupils, exposing to view in each eye a well defined swollen, rather dense lens with spoke-like opacities extending from periphery towards the center, but not as yet invading the center. Segmentation of the lens was demonstrable, but no central linear or other opacities were observed.

Examination of the vitreous and fundus was entirely negative. The condition of the extraocular muscle balance was expressed by nine degrees interni, nine degrees externi, two degrees superior recti, two degrees inferior recti, orthophoria in the horizontal and vertical planes. Examination of the fields for white, red and green, in both eyes, showed them to be normal and without the presence of any abnormal scotomata.

Examination of the refraction at this time (May 29, 1913) gave the following formula:

R., +0.75 S.+0.50 C. ax. 90°=5/7.5.
L., +1.00 S.=5/7.5.
Add+3.00 S. both eyes=0.50 M. type at 35 centimeters.

Approximately three months later the patient returned with all the disturbances of vision (inability to read, or see at distance without diplopia or color sensations) exaggerated and intensified. Another detailed examination showed nothing abnormal except an increase in the cloudiness of the lens. The changes in the lens were further indicated by a change in the refraction. Thus at this time (August 4, 1913) we find:

R., 5/60+0.25 S.+0.50 C. axis 90°=5/45.
L., 5/45+1.00 S.=5/30.
Add+4.00 S. both eyes=0.50 M. type at 30 centimeters.

A short time later the refraction registered (October 7, 1913):

R., 5/22.5+1.00 S.+0.50 C. ax. 180°=5/12.
L., 5/22.5+1.00 S.+0.25 C. ax. 180°=5/9?.

Add+3.00 S.=
R., 1.25 M. type.
L., 1.00 M. type at 30 centimeters.

The changes in the crystallin lenses were indicated by the change in the axes of the cylinders, by the acceptance of a cylinder in a previously spheric defect, and by the alteration of the near point. Despite these findings on the test letter charts, the vision obtained was of very little practical importance to the patient. He could get about without aid, but could not read papers or books, nor could he follow his vocation as church organist and music teacher. He was more than partially disabled—in his case he was totally incapacitated. It was possible to demonstrate increasing opacity of the peripheral portions of both lenses, worse in the right eye, in which it was encroaching upon the center. Position, projection and perception were good in all parts of the field. The patient was prevailed upon to give up attempts at near work and to try to build up his general health while awaiting maturation of the cataract, which was unquestionably present, although incipient in character. The low vision and monocular diplopia prevented him from accomplishing anything, but until this date he had persisted in attempts to do so.

Two months later (December 27, 1913) the darkening in the periphery of the lens was found to be increasing, while the center seemed a trifle clearer than at the previous examination. The refraction at this time showed:

R., 5/15?+1.00 S.+0.50 C. ax. 180°=5/7.5?.
L., 5/22.5+1.00 S.+0.25 C. ax. 180°=5/9?.
Add+3.00 S. both eyes=1.00 M. type at 35 centimeters.

It should be borne in mind in considering this case that the vision fractions obtained represent the maximum vision obtained under the best circumstances with all the encouragement the examiner could supply in the way of suggestive letters, etc. (academic vision, so to speak), while in reality patient was able only to distinguish gross objects. Otherwise this case becomes very commonplace, since a 5/9 vision is ordinarily sufficient for anyone, and there is no point to this record. A variety of lenses was tried and ordered, with the idea of increasing visual acuity, but to no purpose. The subjective tests were discarded and retinoscopic results were used, but these were also found to vary, and were ignored for the time.

Two months later (February 5, 1914), detailed examination with dilated pupil showed the lenses to be clearing in the periphery and the spoke-like opacities to have disappeared in many places. The refraction at this date showed:

R., 5/15+1.00 S.+0.50 C. axis 180°=5/7.5.
L., 5/15+1.00 S.+0.25 C. axis 180°=5/9.
Add+3.00 S. both eyes=0.50 M. at 35 centimeters.

It will be noted that here occurred a definite increase in vision without correction, taken under the same circumstances as former examinations, even to the time of day of the examination.

At the next examination (May 1, 1914) the patient reported that he was able to do a fair amount of near work with comparative comfort, and that the diplopia had ceased. Detailed examination under a mydriatic (euphthalmin) showed the crystallin lenses to be almost entirely clear. The eyes were normal in every other particular. The refraction, estimated objectively and subjectively, showed:

R., 5/15+1.00 S.+0.50 C. ax. 180°=5/9+.
L., 5/15+1.25 S.+0.25 C. ax. 180°=5/9.
Add+3.00 S. both eyes=0.50 M. at 35 centimeters.

At a subsequent examination (August 27, 1914) the visual results were found to be constant, and the patient returned to work, the same kind of work he had discontinued one year previously, and, with his near point arranged for a comfortable working distance by the addition of+1.75 S. instead of +3.00 S., he was able to retake his place in the world as a wage earner.

Recently (August 24, 1915) he was examined and the crystallin lenses were found to be entirely clear. He had continued uninterruptedly at his work without the slightest disturbance of vision, and without diplopia. His refraction at this time showed:

R., 5/22.5+, +1.50 S.=0.50 C. ax. 180°+5/5?.
L., 5/15? , +1.50 S.+0.50 C. ax. 180°=5/5?.
Add+3.00 S. both eyes=0.50 M. at 35 centimeters.

The first point in this record is the early recognition of the causes of apparently trivial disturbances of vision that resist ordinary treatment in persons past middle life. The second point of importance is the distinction between purely conventional or academic vision, as expressed by the test type, and vision of a practical or elastic character that would permit of the pursuance of a vocation normal to the particular individual. The third point is the value of ocular rest in the stage of swelling in incipient cataract. In this case the swelling subsided, the segments of the lens assumed the normal close apposition so that all opacification disappeared. This further emphasizes the fact that all incipient cataracts do not progress towards maturity.

It may be noted, in passing, that in one of the intervals between his visits, one of his friends, with his permission, circulated a request among five thousand people for a certain prayer daily for the restoration of his vision. He naturally attributed his recovery to this source.

Somewhat allied to this case is one observed by the writer, in which pronounced lenticular changes remained comparatively stationary, as regards vision, over a period of twenty-five years. During this period the segmentation of the lens arranged and rearranged itself like a kaleidoscope many times, but a careful examination of the refraction would serve to bring the clear part of the lens to the highest state of efficiency.

The history was, briefly, the patient, a seamstress by occupation, was fifty-two years of age when she first consulted me in 1904. Fourteen years previously she had been examined at the University Hospital, Philadelphia, by Dr. William Norris, who informed her she had cataracts and to prepare herself for operation, as nothing else would be of any permanent value. One of his assistants at that time, Dr. Wallace, however, took upon himself the task of examining the patient's refraction and, to his great astonishment, found he could improve her vision to almost normal. He prescribed glasses and continued to do so at frequent intervals for a number of years to within a short time of the patient coming under my observation.

In 1904 she consulted me, not because of a failure of Dr. Wallace's method, but on account of other reasons, with a long list of symptoms, including frontal headache, lacrimation, recession of the near point, asthenopic symptoms, migrain, nausea and diplopia. Detailed examination of both eyes showed frank, unmistakable, incipient cataract in each eye, with numerous radiating linear opacities. The fundus was normal. Encouraged by Dr. Wallace's experiment, the refraction was carefully examined and showed:

R., 4/15+0.50 S.—0.75 C. ax. 90°=4/9.
L., 4/15+0.25 S.—0.50 C. ax. 90°=4/12+.
Add+2.75 S. both eyes=0.62 M. at 35 centimeters.

(Transposition of the distance correction would not give the same distance vision as the arrangement given, a peculiarity of all cataract refraction, whether before or after removal of the crystallin lens.)

This correction was ordered and worn for fifteen months, when vision with it was found to have changed to: R., 4/12; L., 4/15, and near vision consisted in reading the 1.00 M. type at thirty-five centimeters. Distance vision without correction was the same as formerly.

The refraction was found to have changed to:

R.,+0.25 S.
L.,+0.25 S.
Add+3.00 S.=0.75 M. type at 35 centimeters.

Two years later (1907) the lenticular opacities appeared to have increased in size. The refraction then registered:

R., 5/15?+1.00 S.—1.00 C. ax. 90°=5/12.
L., 5/22.5+0.25 S.—0.75 C. ax. 90°=5/22.5.
Add+3.25 S. both eyes=0.75 M. type at 30 centimeters.

At the end of another period of two years (1909) another formula was obtained, namely:

R., 5/15—0.50 S.+1.00 C. ax. 30°=5/9?.
Add+4.50 S.=0.75 M. type at 28 centimeters.
L., 5/22.5+0.25 S.—0.75 C. ax. 150°=5/15.
Add+3.50 S.=0.75 M. type at 28 centimeters.

In 1911 the examination showed:

R., —0.25 S.+1.75 C. ax. 180°=5/12?.
Add+3.75 S.=0.75 M. type at 25 centimeters.
L., —0.25 S.—1.50 C. ax. 60°=5/15.
Add+4.00 S.=0.75 M. type at 25 centimeters.

One year later (1912) the refraction showed other changes:

R., 5/15 +1.25 C. ax. 45°=5/9?.
L., 5/15?—1.00 C. ax. 60°=5/15.
Add+4.00 S. both eyes=0.75 M. type at 35 centimeters.

After a lapse of another year (1913) the formula read:

R., 5/15 —0.75 S.+1.25 C. ax. 90°=5/12?.
L., 5/22.5+0.50 S.—1.25 C. ax. 180°=5/22.5.
Add+3.75 S.
R. eye=0.75 M. type at 30 centimeters.
L. eye=1.00 M. type at 30 centimeters.

The notes then read that the cataract in the left eye was maturing, and the patient was so informed.

Approximately ten months later (1914) the ametropia equaled:

R., 5/30—1.00 S.+1.25 C. ax. 90°=5/12?.
Add+3.75 S.=0.75 M. type at 30 centimeters.
L., 5/30+0.75 S.—1.00 C. ax. 180°=5/15.
Add+3.75 S.=1.00 M. type at 30 centimeters.

In June, 1915, the examination showed:

R., 5/15+0.75 C. ax. 150°=5/12+.
L., 5/30+0.25 S.+0.75 C. ax. 120°=5/15.
Add+3.75 S. both eyes=0.75 M. type at 35 centimeters.

The patient was advised on more than one occasion within the last three years to prepare, financially and otherwise, for operation, but barring a few intervals, due to other causes, has continued almost uninterruptedly in the pursuit of her vocation as dressmaker and seamstress. Of late she has delegated the finer work to other hands, partly on account of tiring of the eyes it caused, and partly by reason of an intention to conserve the sight.

Another case illustrating this point came under the writer's observation in 1907. The patient, a woman about sixty-five years of age, had been under the care of a colleague for several years before, and he had noted at least three years previously opacities involving the entire lower half of the lens in the right eye, and a quadrant, below and in, of the lens in the right eye. When my record began, these were both pronounced and readily demonstrated to any one. Her vision was: R., 5/9; L., 5/12, and with the correction, previously prescribed, was: R., 5/9; L., 5/7.5. With the exception of some tear duct trouble on both sides, the eyes were otherwise normal. The refraction in 1907 was expressed by:

R., 5/9 —1.00 C. ax. 45°=5/7.5?.
L., 5/12—0.50 C. ax. 90°=5/6??.
Add+2.75 S.=0.50 M. type at 35 centimeters.

About twenty months later (in 1908), repeated examination of the refraction determined it to be:

R., 5/15—0.50 S.—0.50 C. ax. 90°—5/7.5+.
L., 5/9+, —0.50 C. ax. 90°=5/6.

Add+3.00 S. both eyes=0.62 M. type at 35 centimeters.

One year later (1909) her vision, with the same correction, increased to 5/6, 5/6 distance and reading of 0.50 M. type at thirty-five centimeters.

In 1911 the following formula was obtained:

R., 5/15—0.75 S.—0.50 C. ax. 90°=5/9+.
Add+3.50 S.=0.62 M. type at 30 centimeters.
L., 5/9—0.75 C. ax. 90°=5/6?.
Add+3.00 S.=0.50 M. type at 35 centimeters.

It was not until 1913, approximately two years later, that the patient noticed any appreciable disturbance of vision. Close work became troublesome. Then a slight change in the formula improved her sight:

R., 5/12—0.50 S.—0.75 C. ax. 90°=5/9.
Add+3.50 S.=1.00 M. type at 35 centimeters.
L., 5/7.5—0.75 C. ax. 90°=5/5?.
Add+3.50 S.=0.50 M. type at 35 centimeters.

In 1914 (August 7, 1914) the formula was:

R., 5/15—0.25 S.—1.00 C. ax. 90°=5/9?.
Add+4.00 S.=1.00 M. type at 35 centimeters.
L., 5/9?—0.50 C. ax. 90°=5/7.5.
Add+3.50 S.=0.50 M. type at 35 centimeters.

It should be noted that there is a progressive improvement in the vision of the left eye, despite the fact that it was difficult to see the fundus through the opaque lens. A clear center had been maintained in both eyes throughout this entire period.

After a prolonged illness, she was again examined in 1915 (September 30, 1915), and showed:

R., 5/15?—1.25 C. ax. 90°=5/12.
Add+4.00 S.=1.00 M. type at 35 centimeters.
L., 5/9?—0.50 C. ax. 90°=5/7.5.
Add+4.00 S.=0.50 M. type at 35 centimeters.

At this time there was a pronounced haziness of the entire lens in both eyes, in addition to the numerous opacities, and segmentation of the lens. In this case operation was out of question during the last five years of the condition, for reasons other than ocular, although the tear duct disease might have offered an objection, had extraction been considered. Consequently, it was necessary to find some more simple way of conserving vision. The expense of examination and glasses was of no moment to her, consequently numerous examinations at frequent intervals were made and the glasses changed on the slightest indication of a change in the refraction, with a result at the end of eleven years that seems to have justified this course.

COMMENT.

These case histories well illustrate a point occasionally brought forward, to the effect that crystallin lens opacities in persons past middle life do not always progress to full maturity of senile cataract, but that they may remain stationary, or they may undergo incomplete, very rarely complete, absorption. This is manifested by the continuous variations in the refraction; and not uncommonly it is possible to follow up these variations by repeated variations in the correcting lenses. These points borne in mind will often serve to make the way comparatively comfortable for those who are denied the advantage of surgical aid, and will also spare the operative enthusiast the embarrassment mentioned at the beginnig of this paper. To the man whose operative skill is un-questioned, therapeutics is reduced to a matter of operative technic, and the natural history of any condition without treatment (or what amounts to the same thing, modern medical treatment) is entirely ignored, yet it must be taken into consideration, if the best all around results are to be obtained.

That lenticular opacities, whether primary or secondary, are inclined to do curious things is again evidenced by the changes in the cortical and capsular remains following ordinary cataract extraction. Sometimes they absorb spontaneously after a long period; sometimes immediate vision (after a month or so) is good, to be followed by opacification of the shreds in the pupillary area, and proportionate impairment of vision. Again, needling may be sufficient to stimulate absorption of lacerated fragments of capsule and cortical matter. The suggestion is again brought forward that opacities beginning in the periphery and assuming a spoke-like distribution in the course of generalized haziness and apparent segmentation of the lens be given the benefit of the conservative treatment as long as vision of 5/15 can be obtained, and that the diagnosis of incipient cataract be withheld as long as useful vision can be maintained by the use of correcting lenses, reserving the diagnosis for the cases where the progress to maturity from month to month is more pronounced.

XXIII.

THE SCLEROCORNEAL TREPHINING OPERATION FOR GLAUCOMA. A CLINICAL REPORT OF FORTY-FIVE OPERATIONS.*

WALTER R. PARKER, B. S., M. D.,

DETROIT.

The history and development of the technic of the sclerocorneal operation are familiar to you all, and will not be considered in this paper. Mr. E. Treacher Collins has said: "There are two methods by which the details and technic of an operative procedure may be developed and perfected; one is by the critical observation of clinic phenomena, and the other by the study of pathologic specimens and physiologic processes." I wish to present for your consideration the result of clinic observations of forty-five operations performed for the relief of glaucoma, after the Elliot method.

The records of the cases here given are from my service in the Ophthalmic Clinic of the University of Michigan, with the exception of two, which are from my private records. Twenty-seven of the forty-five cases, together with one hundred operated upon by Col. Elliot during the time of his first visit to this country, were reported before the Ophthalmological Section of the American Medical Association, held in Atlantic City in June, 1914.

The first operation was performed October 3, 1912, and the report contains all the cases operated upon since that date.

Following is a summary of the cases with tables showing the results obtained in the different types of glaucoma, together with the frequency of the occurrence of iritis in the different methods of treatment of the iris:

TABLE 1—SUMMARY OF CASES

Males	24	Number of Operations	26
Females	12	Number of Operations	16
Total	36	Total	45

Number of cases in which both eyes were trephined	7
Number of cases in which the same eye was trephined twice	2

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*Read before the Otoophthalmological Society of the Pacific Coast, in San Francisco, June 15, 1915.

The technic employed has been the same as that first recommended by Col. Elliot, except in the character of the conjunctival flap. In these changes I have followed his later recommendations, and I believe, as he suggests, that the large flap, including in its lower one-third all the tissues down to the sclera, is a decided factor in preventing the vesicular type

TABLE 2—NUMBER AND TYPES OF CASES, TOGETHER WITH THE RESULTS OBTAINED IN EACH TYPE OF GLAUCOMA

Classification	No. of Cases	Good	Per Cent	Results	
				Poor	Failure
Acute	1	....	....	....	1
Simple	21	16	76.18	3	2
Chronic Inflammatory	12	5	41.6	2	5
Secondary to Cataract Extraction	2	....	....	1	1
Secondary to Luxated Lens	2	1	....	....	1
Secondary to Traumatism	2	1	....	....	1
Secondary to Uveitis	2	1	....	....	1
Hemorrhagic	1	....	....	....	1
Buphthalmos	2	....	....	....	2
Total	45	24	....	6	15

TABLE 3—RESULTS OBTAINED IN CASES OF SIMPLE GLAUCOMA COMPARED WITH THOSE OF ALL OTHER TYPES OF THE DISEASE AS CLASSIFIED

Type	No.	Good	Per Cent	Poor	Per Cent	Failure	Per Cent
Simple	21	16	76.18	3	14.3	2	9.52
Other Types	24	8	33.33	3	14.3	13	51.4
Total	45	24	....	6	....	15	....

of filtration scar and greatly diminishes the risk of late infection.

The flap is described in detail by Col. Elliot as follows:

TABLE 4—CLASSIFICATION WITH REFERENCE TO THE PRESENCE OR ABSENCE OF IRITIS IN THE DIFFERENT METHODS OF TREATMENT OF THE IRIS

Character of Iridectomy	No.	Iritis	Per Cent	No Iritis	Per Cent
Complete	15	2	13.3	13	86.7
Previous Iridectomy	9	2	22.2	7	77.8
Partial Iridectomy	13	7	53.8	6	46.2
Without Iridectomy	8	5	62.5	3	37.5
Total	45	16	....	29	....
Total Number of Cases of Complete and Previous Iridectomy	24	4	16.6	20	83.4
Total Number of Cases of Partial or Without Iridectomy	21	12	57.1	9	42.9
Total	45	16	....	29	....

Iritis Occurred in the Different Types of Glaucoma as Follows:

Type	No.	Iritis	Per Cent
Acute	1	1	100
Simple	21	6	29
Chronic Inflammatory	12	6	50
Secondary to Cataract	2	2	100
Secondary to Traumatism	2	1	50

"The flap made must be as large as possible, the first incision passing almost up to the fornix, and the extremities of this incision must be kept away from the limbus. It is not even necessary to make the conjunctival incision concentric with the limbus. It is sufficient to make a long cut slightly concave downward—i. e., toward the cornea. The whole area outlined by the flap must not be dissected up. The aim should be to produce a wide area for slow filtration, in which the meshes of the tissue are damaged as little as possible. The tissue near the ends of the incision are left undisturbed, while the center of the flap is dissected down to the limbus sufficiently to allow space in which to split the cornea and apply the trephine. The flap, which must be held down during the entire manipulation, springs back as soon as released, and can be approximated by a single suture. The thickness of the flap is of the greatest importance. The upper half need include little more than the conjunctiva itself, but the last few millimeters of the dissection should include all the tissues down to the sclera. By this procedure the base of the flap is made as thick as possible."

There is no direct relation between the size of the visible filtration area and the efficiency of the drainage. Some of the most favorable cases show practically no elevation of the tissues at the site of the trephine opening.

There are no cases of late infection in this series, although in one case the conjunctiva is worn through, the chamber is empty, and I fear it is only a question of time when infection will take place.

I shall not give a detailed report of all the cases in which the results were recorded as failures, but rather briefly refer to those showing unusual features.

Intraocular hemorrhage occurred in three cases, two going to enucleation. All three presented the typical picture as described by Col. Elliot. There was loss of vitreous, accompanied with pain and increased intraocular tension. In two cases of buphthalmos the operation failed to relieve the tension. Vitreous was lost in both cases, and it may be the opening was made too far back. In two cases of the chronic inflammatory type there was ectasia of the iris, and the eye remained painful and irritable. Another case of the inflammatory type occurred in a woman aged sixty-two years. Vision nil. Tension, right eye, sixty millimeters; left eye, eighty millimeters. Both eyes were trephined with peripheral iridectomy. The immediate effect on the right eye was unsatisfactory, the inflammatory reaction continuing as well as the increased tension. A second operation was performed. Four months later there was an ectasia of the iris in both trephine openings, and the tension was sixty millimeters. After twenty-five months the prolapse at the site of the operation had disappeared, there was a small dark spot in the conjunctiva at the site of each opening, and the globe showed beginning phthisis bulbi.

The only case of quiet iritis which resulted in loss of vision occurred in a private case, a woman aged sixty-two years. She had suffered from the effects of glaucoma of noninflammatory type for two years, during most of which time she had been using eserin. When first seen the vision in each eye with correction was 6/9; tension, right eye, thirty-one millimeters; left eye, forty-three millimeters. Sclerocorneal operation with peripheral iridectomy was performed on the left eye without accident. The wound remained open for nineteen days, when, in spite of the use of atropin after the second day, the iris became bound down and gradually the pupil became occluded, and the vision reduced to light perception. The filtration was perfect and the tension remained at fifteen millimeters. A deep iridectomy was performed on the other eye, which showed the same condition. The tension was reduced to eighteen millimeters, and the vision with correction has remained 6/9, as before operation.

DISCUSSION.

The final test of any procedure for the relief of glaucoma must include its remote effect on the tension and integrity of the globe, and on its physiologic function. The result in the individual case depends on the type and stage of the disease when it comes under treatment. As the majority of the cases here reported came under observation after the vision had become seriously impaired or lost, deduction can be made only as to the effect of the operation on the tension and integrity of the globe.

The results in many of the cases recorded as good were in reality excellent, and apparently left nothing to be desired. My experience in this respect corresponds with that of all surgeons who have employed the Elliot operation. This is especially true in the cases in which the modified conjunctival flap was made. I shall not discuss in detail the cases in which the results were good, but rather consider the question of when the operation can be used to best advantage, and what method of treatment of the iris gives the best results.

It must be borne in mind that many of the cases here recorded were unfavorable for any operative procedure. In a few cases of absolute glaucoma in which formerly an enucleation would have been performed, the eyes were made quiet and comfortable by the trephine operation, and I believe one of its best uses is in this type of the disease.

To show the relative value of the operation in different types of glaucoma the following comparisons are made: In the twenty-one cases of simple glaucoma good results were obtained in sixteen, or 76.18 per cent. In the twelve cases of the chronic inflammatory type good results were obtained in five, or 41.6 per cent. In the twenty-four cases of all types except the simple, good results were obtained in eight, or 33.33 per cent. The results were better in the simple cases as compared to those in the chronic inflammatory type, in the proportion of 76.18 to 41.6, and as compared to those in all types in the proportion of 76.18 to 33.33.

There are four methods of dealing with the iris, namely: An iridectomy may have been performed, or at the time of the trephine operation the iris may be left intact; a small peripheral portion may be excised, or a complete iridectomy performed. By complete iridectomy is meant that the pupillary border of the iris is included in the coloboma.

To show the relative value of these different methods of treatment of the iris the following comparisons are made: A previous iridectomy was performed in nine cases, a complete in fifteen, a partial in thirteen, and the iris left intact in eight. In the nine cases in which a previous iridectomy had been performed, iritis followed in 22.2 per cent. In the fifteen cases in which a complete iridectomy was performed, iritis followed in 13.3 per cent. In the thirteen cases in which a partial iridectomy was performed, iritis followed in 53.3 per cent. In the eight cases in which the iris was left intact, iritis followed in 62.5 per cent.

Comparing the total number of cases in which a previous or complete iridectomy was done with those in which a partial or no iridectomy was performed, the results were as follows: In the twenty-four cases in which a complete or previous iridectomy was performed, iritis followed in 16.6 per cent of the cases, while in the twenty-one cases in which a partial or no iridectomy was performed, iritis followed in 57.1 per cent.

It would appear, therefore, from this limited number of cases that the sclerocorneal trephine operation for the relief of glaucoma was indicated in the simple cases of the disease as compared with all other types in the proportion of 76.18 to 33.33, and a previous or complete iridectomy as compared to a partial or no iridectomy in the proportion of 57.1 to 16.6.

I believe that the sclerocorneal trephine operation which Col. Elliot has given us offers a method of procedure that is to take a permanent place in the treatment of glaucoma. I cannot but feel, however, that no one method of procedure is applicable to all forms of glaucoma, and I doubt very much if the deep iridectomy of von Graefe is to be superseded in cases of acute and possibly subacute cases, where it has so long reigned supreme. Nor am I entirely convinced that in simple cases if seen early and miotics have failed, it is not better to do a deep iridectomy, reserving the trephine operation for those cases in which the iridectomy has failed. To this group I would add all the cases of every type in which an iridectomy is contraindicated.

XXIV.

EPIBULBAR SARCOMA.*

Report of a Case With a New Technic for Use and Treatment With Roentgen Ray. Patient, Treated in 1910, Cured and Remains So.

Edward B. Heckel, A. M., M. D., F. A. C. S.,

from the service of the allegheny general hospital,

Pittsburgh.

Malignant epibulbar neoplasms are sufficiently rare that when one presents itself it is worthy of the most careful study. The recognition of the neoplasm is not especially difficult, and particularly so when it is possible to excise a bit for pathologic examination. It is the treatment which interests us most and which concerns the unfortunate patient more than anything else.

Heretofore the classic line of treatment has been an excision of the neoplasm, followed only too soon by a return of the growth, with an ultimate enucleation of the eyeball or even a complete exenteration of the orbit, the whole soon resulting in a fatal issue of the patient himself.

It may be good surgery for the general surgeon to say that all malignant disease should be excised, but malignancy about the eyeball or its adnexa should, I believe, be treated without the knife. The first commandment of the cancer decalogue is "Do not cut across a cancer and leave part behind. The part remaining will grow more rapidly than if you had left it alone altogether." In addition, we have in the Roentgen ray and radium emanations, two agents which undoubtedly produce a selective necrosis of malignant tissue. The use of the Roentgen ray is not particularly new in these cases, but good results, I believe, are. The writer has used it, or had it used, according to the old technic, in two cases without any flatter-

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*Read before the American Academy of Ophthalmology and Otolaryngology, Chicago, Illinois, October 5, 1915.

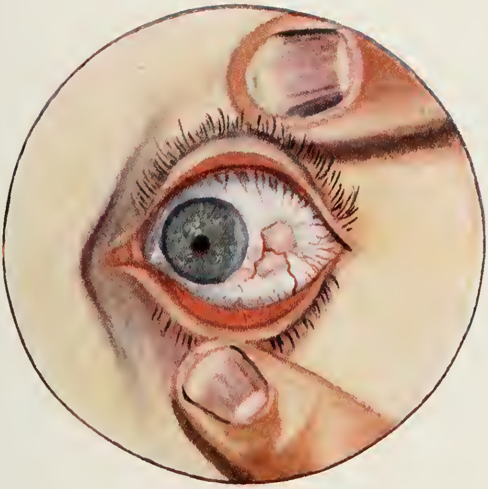

Figure 1.

ing result, especially in the preservation of a functionating eye.

It has been the good fortune of the writer to see, study and treat one case with a technic different than any used heretofore, and with a result which is more than satisfactory.

Capt. A. H., aged sixty-nine years, was brought to me for consultation by Dr. Charles Emmerling, on September 5, 1910. In April, 1910, the patient had noticed a small mass on the temporal side of his left eyeball. He consulted an oculist, who excised the mass and gave a good prognosis. The growth soon returned, however, with increased activity, and presented the appearance shown in Figure 1, when seen by the writer in September, 1910. The malignant nature of the neoplasm was at once suspected. A piece was excised for examination by Dr. Proescher, who, after a few days reported it to be a spindle celled sarcoma. (Figure 2.) On October 3, 1910, the patient was seen with the writer by Dr. S. D. Risley, of Philadelphia, who, after examining the patient clinically and the findings of

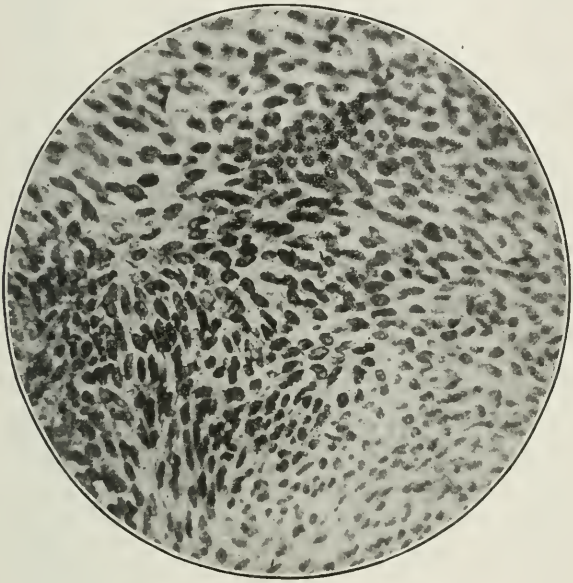

Fig. 2.

the pathologist, concurred in the diagnosis. The use of the Roentgen ray was decided upon, and the first application was made on the following day. We had considerable difficulty in exposing the eyeball by the use of a speculum. After several exposures in this way, and remembering the fatal results to the exposed cornea in two previous cases, the writer decided upon the technic carried out in this case, and to which he ascribes the very excellent result obtained—namely, a perfectly normal eye, functionating perfectly, and no return of the neoplasm at the present writing, five years after the patient was seen and the disease recognized.

The technic consisted of the use of the fingers of the writer as a means of exposing the eyeball (Figure 3) and the constant dropping of a normal salt solution upon the cornea of the exposed eyeball during the application of the Roentgen ray. The Roentgen ray was applied by Dr. Geo. C. Johnston, under the supervision of the writer, by means of a lead glass tube with a small flint glass window inserted in the wall, over which was fitted a speculum of lead glass terminating in an orifice of about one-half inch in diameter. The tube was so placed (Figure 3) that the orifice of the speculum was within a centimeter or less of the neoplasm. The tube used was one capable of maintaining a vacuum during the treatment, which permitted the passage of a current of three-quarters to one milliampere. The length of the exposures were from three to six minutes, and were applied three times per week during October, November and December of 1910, and three times per week during January, and once per week during February and March of 1911, when the eyeball presented a perfectly normal appearance and functionated normally in every way.

In May of 1911 the eyeball showed a small nodule about one millimeter in diameter at the sclerocorneal junction at the six o'clock point, with a few small vessels extending into the cornea; these vessels could be seen only by means of a strong loupe. The Roentgen ray was again resorted to with the above technic, and applied seven times during May and eleven times in June, with a complete disappearance of the nodule.

There is no doubt in the writer's mind that the constant dropping of normal salt solution upon the exposed eyeball is responsible for the good result obtained. The healthy tissues, and especially the cornea, are distinctly protected by the salt solution, while it does not interfere in the least with the selective necrotic action on the malignant neoplasm.

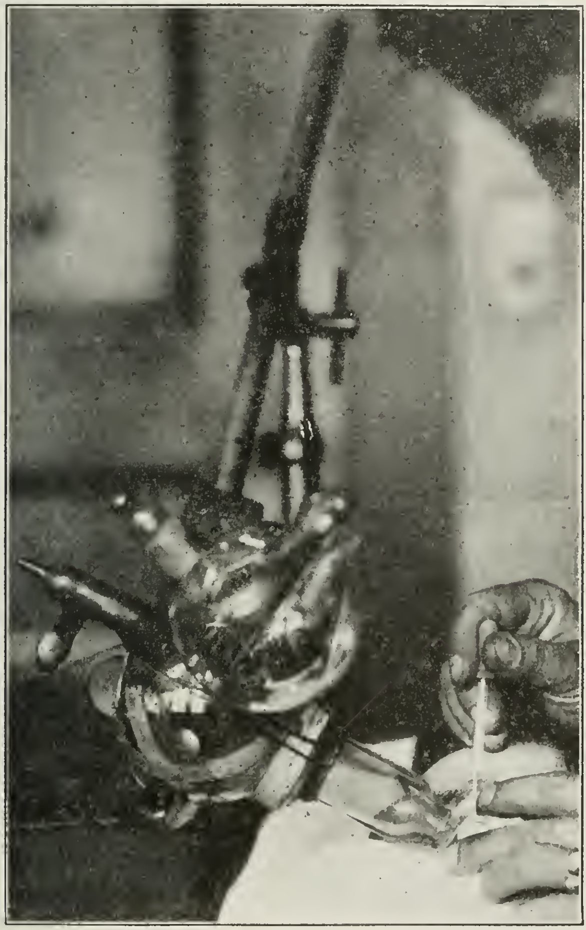

Fig. 3.

The writer wishes further to emphasize the fact that such cases can be treated successfully only by the closest co-operation of the roentgenologist and the ophthalmologist.

XXV.

A REPORT OF SIX CASES TREATED WITH TUBERCULIN, INCLUDING CASES OF KERATITIS, CHOROIDITIS AND CYCLITIS.

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Baltimore.

Being convinced several years ago that many of our eye lesions which did so badly under our routine treatment must have an etiologic factor other than idiopathic, and that autointoxication did not account for the same, we determined to investigate more carefully from a tubercular standpoint.

The first case, J. K., which gave us such an opportunity, presented herself at the Baltimore Eye and Ear Dispensary, November 13, 1911, with history that the left eye had been sore for one week. Upon examination there was seen a flame-like exudate in the upper outer quadrant of the cornea which did not stain with fluorescin. There was also some inflammation of the sclera in the same region. The infiltration extended until finally it reached a short distance beyond the center of the cornea, with deposits on Descemet's membrane. Wassermann reaction was negative: von Pirquet test, positive. Physical examination by Dr. Freeman showed mucous rales at the apex of the right lung. The patient was taken into the hospital and 1/500 milligram of T. R. given on November 29th. Atropin, four grains to the ounce, had been used in the eyes since the first visit. Following the injection there was no rise in temperature, but slight increased redness about the eye. The patient was now given increasing doses of T. R. until January 22nd, when 1/40 milligram gave both a slight local and general reaction, the temperature going to 99.5°. At this time the opacity was much smaller and thinner. On January 31st, 1/60 of a milligram of T. R. was given, and increased up to 1/40 on the 16th of February, when the cornea was practically clear with no circumcorneal injection. During the treatment the patient increased in weight and felt very much better.

While we admit that this condition very frequently occurs and recovers without the use of tuberculin, we believe that so long as the Wassermann reaction was negative, there was an area in the lung which was suspicious, and as we obtained both a local and general reaction with the larger doses of T. R., we are justified in making the diagnosis of tubercular sclerokeratitis, and certainly the results are very gratifying. (See Table I.)

TABLE I.

November 29, 1911, milligram T. R., 1/500.

December 4, 1911, milligram T. R., 1/400.

December 5, 1911, milligram T. R., 1/300.

December 11, 1911, milligram T. R., 1/200.

December 13, 1911, milligram T. R., 1/100 (about half lost). Large opacity in upper outer quadrant still dense but smaller; other opacities much thinner.

December 18, 1911, milligram T. R., 1-90. Opacity still smaller and thinner.

December 27, 1911, milligram T. R., 1/80. Dr. Freeman reports no rales in lungs.

January 3, 1912, milligram T. R., 1-70. No congestion; opacity smaller.

January 8, 1912, milligram T. R., 1-60.

January 15, 1912, milligram T. R., 1/50.

January 22, 1912, milligram T. R., 1/40. Made arm sore and gave temperature of 99.2°.

January 31, 1912, milligram T. R., 1/60. No reaction followed.

February 5, 1912, milligram T. R., 1/60.

February 9, 1912, milligram T. R., 1/40.

February 16, 1912, milligram T. R., 1/40.

The second case of keratitis was Mrs. A. McC., aged fifty-two years, a large fleshy woman, who consulted us September 3, 1913, giving the history that left eye had been painful and red for four weeks, for which she had received treatment at one of the special dispensaries. Family and personal history are negative.

Examination showed well-marked circumcorneal injection, with marked infiltration into both superficial and deep layers of the cornea, extending from the upper temporal margin of cornea, the remaining portion of cornea showing some striations. Atropin locally and sodii salicylat internally were ordered.

September 5, 1913, no improvement. September 7, 1913, slight extension of infiltration. September 15, 1913, infiltration still extending. Von Pirquet faintly positive. September 17, 1913, some puffiness of face as result of atropin. September 27, 1913, eye more congested, and vessels have started into the deep layers of the cornea in the upper outer quadrant. Atropin discontinued and hyoscin grain one to ounce one, substituted. It was now decided to try T. R.

By referring to her tuberculin chart you will see that the eye showed no focal reaction until ⅛ milligram T. R. was given; then the eye apparently became sensitized, so that in starting again, even with 1/500 milligram, there appeared a focal reaction.

You will also note that after starting the T. R. we were fearful that we had overlooked a specific taint, although she had several healthy children; but upon examination her Wassermann was negative.

Her vision at commencement of tuberculin treatment was motion, while at present the cornea shows numerous macula and vision with correction is 20/100 plus. (See Table II.)

TABLE II.

September 30, 1913, milligram T. R., 1/500. No focal or local reaction.
October 3, 1913, milligram T. R., 1/400.
October 6, 1913, milligram T. R., 1/300.
October 10, 1913, milligram T. R., 1/200.
October 13, 1913, milligram T. R., 1/100.
October 17, 1913, milligram T. R., 1/90.
October 20, 1913, milligram T. R., 1/80. Slight local reaction.
October 30, 1913, milligram T. R., 1/200.
November 1, 1913, milligram T. R., 1/100.
November 4, 1913, milligram T. R., 1/50.
November 7, 1913, milligram T. R., 1/10. Slight local reaction.
November 12, 1913. Wassermann reaction negative.
November 14, 1913, milligram T. R., 1/10.
November 18, 1913, milligram T. R., 1/9. Vessels coming in from below.
November 21, 1913, milligram T. R., 1/8.
November 23, 1913. Eye shows focal reaction. T. R. discontinued.
December 11, 1913. Infiltration extending through entire cornea. Says eye is more painful since stopping T. R.
December 13, 1913. Commenced tuberculin again.
December 13, 1913, milligram T. R., 1/500. Focal reaction.
December 30, 1913, milligram T. R., 1/500.
January 5, 1914, milligram T. R., 1/1000.
January 10, 1914, milligram T. R., 1/1000.
January 13, 1914, milligram T. R., 1/900.
January 16, 1914, milligram T. R., 1/900.

January 20, 1914, milligram T. R., 1/900. No reaction.
January 22, 1914, milligram T. R., 1/800.
January 27, 1914, milligram T. R., 1/700.
January 30, 1914, milligram T. R., 1/600.
February 3, 1914, milligram T. R., 1/500.
February 6, 1914, milligram T. R. 1/400.
February 10, 1914, milligram T. R., 1/300.
February 13, 1914, milligram T. R., 1/200.
February 17, 1914, milligram T .R., 1/100.
February 20, 1914, milligram T. R., 1/90. Slight reaction.
February 24, 1914, milligram T. R., 1.90. No reaction.
February 27, 1914, milligram T. R., 1/80. No reaction.
March 3, 1914, milligram T. R., 1/70. Slight reaction.
March 6, 1914, milligram T. R., 1-70. No reaction.
March 10, 1914, milligram T. R., 1/60. No reaction.
March 12, 1914, milligram T. R., 1/50. No reaction.
March 17, 1914, milligram T. R., 1/40. No reaction.
March 20, 1914, milligram T. R., 1/30. No reaction.
March 24, 1914, milligram T. R., 1/20. No reaction.
March 27, 1914, milligram T. R., 1/10. Reaction.
April 2, 1914, milligram T. R., 1/9. Reaction.
April 7, 1914, milligram T. R., 1/10. Reaction.
April 10, 1914, milligram T. R., 1/10. Reaction.
April 14, 1914, milligram T. R., 1/10. Reaction.
April 17, 1914, milligram T. R., 1/10. No reaction.
April 21, 1914, milligram T. R., 1/9. Reaction.
May 5, 1914, milligram T. R., 1/10. No reaction.
May 8, 1914, milligram T. R., 1/9. No reaction.
May 12, 1914, milligram T. R., 1/8. No reaction.
May 15, 1914, milligram T. R., 1/7. No reaction.
May 19, 1914, milligram T. R., 1/6. No reaction.
May 26, 1914, milligram T. R., 1/5. No reaction.
June 5, 1914, milligram T. R., 1/4. No reaction; counts fingers.
June 11, 1914, milligram T. R., 1/3. No reaction.
June 26, 1914, milligram T. R., 1/2. No reaction.
July 3, 1914, milligram T. R., 1/2. No reaction.
July 10, 1914, milligram T. R., 1/2. No reaction.
July 21, 1914, milligram T. R., 1/2. No reaction.
August 6, 1914, milligram T. R., 1/2. No reaction.
August 18, 1914, milligram T. R., 1/2. No reaction.
September 1, 1914, milligram T. R., 1/2. No reaction.

November 20, 1914. Keratitis seems to be entirely healed, with large scar across cornea.

Our third case of keratitis presents the following: H. B. D., aged twenty-one years, a short pale young man. Family and personal history are negative.

Eye history: Right eye defective since childhood; left eye has been red and painful for several weeks, for which he has had treatment at the hands of one of our leading oculists, and also at one of the special dispensaries.

Examination shows numerous maculæ in superficial layers of right cornea, probably result of old phlyctenular trouble.

Left eye shows phlyctenular ulcer near center of cornea, with vascularization taking place.

Ulcer was cauterized; atropin, yellow salve, and dionin used locally, and iron internally, but pain and photophobia became gradually worse, and so was advised to go to hospital. April 8, 1915, one milligram T. R. given. April 9th, temperature 100° F., with general malaise. April 10th, Wassermann negative. April 30th, fresh blister near center left cornea.

Although the general reaction was slight, it was decided to start him on T. R., as the condition proved so resistant to all other treatment. (See Table III.)

TABLE III.

May 1, 1915, milligram T. R.. 1/10000.
May 4, 1915, milligram T. R., 1/5000.
May 6, 1915, milligram T. R., 4/5000.
May 11, 1915, milligram T. R., 6/5000.
May 14, 1915, milligram T. R., 7/5000.
May 18, 1915, milligram T. R., 8/5000.
May 21, 1915, milligram T. R., 8/5000.

As condition was clinically well, patient did not report again until October 27, 1915, when he returned with small ulcer on lower part of left cornea, for which he is still under treatment.

January 4, 1916, ulcer healed.

The first case of cyclitis which we thought were justified in using this line of treatment was H. P., a girl, aged twelve years. Difficulty in seeing for two or three weeks. Has been under doctor's care since eyes became sore. Father died of T. B. Aunt died of same. Von Pirquet positive.

Dr. Brumback, upon physical examination, found some cloudiness at the apex of the left lung. The eye examination showed both cornea cloudy, with mutton fat deposits on both Descemet's membrane. The deposits were very large and distributed over the lower half of each cornea, more pronounced in the left. Wassermann reaction was negative; von Pirquet, positive. Weight of patient at this time was sixty-eight pounds.

The patient was put upon tuberculin treatment, giving 1/1000 milligram of T. R., March 27, 1913, and increasing the doses at each treatment, giving two treatments a week. On April 18th, when 1/90 milligram of T. R. was given, a note was made that the corneæ were both clearer, with the deposits much thinner. No general or focal reaction was seen until

June 11th, after ¼ milligram of T. R. was given. The treatment was continued, however, until July 7th, when both corneæ were practically clear and no reaction occurred after discontinuance of the atropin. The weight of the patient had increased under the treatment from sixty-eight to eighty pounds, and her general condition was much improved. (See Table IV.)

TABLE IV.

March 27, 1913, milligram T. R., 1/1000.
March 29, 1913, milligram T. R., 1/900.
March 31, 1913, milligram T. R., 1/800. Followed by stomach upset.
April 2, 1913, milligram T. R., 1/700.
April 4, 1913, milligram T. R., 1/600.
April 7, 1913, milligram T. R., 1/500.
April 9, 1914, milligram T. R., 1/400.
April 11, 1913, milligram T. R., 1/300.
April 14, 1913, milligram T. R., 1/200.
April 16, 1913, milligram T. R., 1/100.
April 18, 1913, milligram T. R., 1/90.
April 21, 1913, milligram T. R., 1/80.
April 23, 1913, milligram T. R., 1/70.
April 26, 1913, milligram T. R., 1/60.
April 28, 1913, milligram T. R., 1/50.
April 30, 1913, milligram T. R., 1/40.
May 2, 1913, milligram T. R., 1/30.
May 5, 1913, milligram T. R., 1/20.
May 7, 1913, milligram T. R., 1/10.
May 9, 1913, milligram T. R., 1/9.
May 12, 1913, milligram T. R., 1/8.
May 14, 1913, milligram T. R., 1/7.
May 16, 1913, milligram T. R., 1/6.
May 19, 1913, milligram T. R., 1/5.
May 21, 1913, milligram T. R., 1/4.
May 26, 1913, milligram T. R., 1/3.
June 2, 1913, milligram T. R., 1/2. Corneæ clearer, deposits thinning out.
June 11, 1913, milligram T. R., 1/4. Slight focal reaction.
June 16, 1913, milligram T. R., 1/3.
June 20, 1913, milligram T. R., 1/2.
June 27, 1913, milligram T. R., 1/4.
July 7, 1913, milligram T. R., 1/4.
July 14, 1913, milligram T. R., 1/4.
July 21, 1913, milligram T. R., 1/4.
July 28, 1913, milligram T. R., 1/4.
August 4, 1913, milligram T. R., 1/3.
August 13, 1913, milligram T. R., 1/2.

Case 5.—H. L., aged twenty-four years. Referred by Dr. Ernest Rowland. A large, healthy looking country girl. Consulted us first on February 24, 1913, with the history that right eye became red and painful five weeks ago, with some diminution of vision.

Examination of right eye revealed some circumcorneal injection, with numerous small deposits on Descemet's membrane; pupil normal in size and reacts to light; dilatation of pupil shows large number of floating opacities in vitreous, with large area of acute choroiditis in upper nasal quadrant. Left eye shows large choroidal atrophy in upper nasal quadrant. Vision: Right eye, 20/200; left eye, 20/30.

Patient was ordered four grains of atropin t. i. d. in eye, with one-tenth grain calomel internally until bowels were thoroughly evacuated. Patient was seen three days later, and vitreous opacities were increased with increase in number and size of deposits on Descemet's membrane.

Dr. Rowland reports patient has no apparent lesion in her general condition. Patient was given three-fourths grain of iodid potassium t. i. d. until March 10, 1913, when she again visited us, and reaction of eye was more marked than on previous visit. At this time the iodid potassium was discontinued, and one-tenth grain of bichlorid of mercury was given three times a day.

The condition slowly increased, with large mutton fat deposits on Descemet's membrane, and on April 26, 1913, she was put in the Maryland General Hospital for a general survey, which was performed by Dr. E. B. Freeman, who reported that stomach analysis showed absence of free HCl; that the blood showed slight increase in percentage of small mononuclear leucocytes. The urine showed very low nitrogenous elimination. Physical examination, slight mitral murmur (possibly hemic). Von Pirquet faintly positive.

Patient was given thirty minims of dilute hydrochloric acid after each meal, to correct the stomach condition.

May 21, 1913, a note was made of beginning vascularization in deeper layers at lower margin of cornea.

June 27, 1913, as patient's vision was reduced to hand motion and no fundus reflex could be seen, with the slightly positive von Pirquet, slight increase in mononuclear leucocytes, and anacidity, it was decided to try tuberculin therapeutically, and T. R. was selected on account of our previous experience, and given in the following doses. (See Table V.)

This case, while lacking a Wassermann reaction, gave such a definite focal reaction, and the condition improved so materially under the use of tuberculin, that I think we are again justified in our diagnosis. One June 27, 1913, when the treatment was started, you will notice that there was no fundus reflex, while one month later the nerve could be distinguished and there was visual acuity of 10/200 and 20/200 after a little over two months' treatment.

TABLE V.

June 27, 1913, milligram T. R., 1/500. Hyp. No fundus reflex.
June 30, 1913, milligram T. R., 1/400.
July 2, 1913, milligram T. R., 1/300.
July 5, 1913, milligram T. R., 1/200.
July 7, 1913, milligram T. R., 1/100.
July 9, 1913, milligram T. R., 1/90.
July 11, 1913. Some increase in circumcorneal injection.
July 14, 1913, milligram T. R., 1/100.
July 18, 1913, milligram T. R., 1/90.
July 21, 1913, milligram T. R., 1/80.
July 23, 1913, milligram T. R., 1/70. Vision, right eye, 10/200; nerve can be made out.
July 25, 1913, milligram T. R., 1/60. Hyp.
July 28, 1913, milligram T. R., 1/50.
July 30, 1913, milligram T. R., 1/40.
August 1, 1913, milligram T. R., 1/30.
August 4, 1913, milligram T. R., 1/20. Vision, right eye, 10/200.
August 6, 1913, milligram T. R., 1/10.
August 8, 1913, milligram T. R., 1/9.
August 11, 1913, milligram T. R., 1/8.
August 13, 1913, milligram T. R., 1/7.
August 15, 1913. Slight local reaction. Had itching of arms twelve hours ago. No T. R. given.
August 20, 1913, milligram T. R., 1/6. Sclerosing keratitis increasing.
August 28, 1913, milligram T. R., 1/5.
September 5, 1913, milligram T. R., 1/4. Vision, right eye, 20/200.
September 12, 1913, milligram T. R., 1/3. Patient states that the day following this injection the eye was much inflamed.
September 18, 1913, milligram T. R., 1/2. Vision, 20/200.
September 20, 1913. No reaction.
September 26, 1913, milligram T. R., 1/2.
October 3, 1913, milligram T. R., 3/4.
October 10, 1913, milligram T. R., 1.
October 17, 1913, milligram T. R., 1.
October 24, 1913, milligram T. R., 1 1/2.
October 31, 1913, milligram T. R., 2.
November 7, 1913, milligram T. R., 2 1/2.
November 14, 1913, milligram T. R., 3.
November 21, 1913, milligram T. R., 3 1/2. Local reaction.
November 29, 1913, milligram T. R., 3.

Case 6.—This is the only case of tubercular choroiditis of the classical moth-eaten variety. E. W. C., white, female, aged thirty-five years, married for three years.

Eye History.—One week ago noticed that she could not see so well out of left eye, which condition has become worse. Family history bad, there being several members of family that have had a tubercular infection. Past history: had tubercular infection several years ago. In her three years of married life she has had three miscarriages, the last being six weeks ago.

Eye examination shows superficial corneal opacities in each eye; pupils normal and react to light; floating opacities in left vitreous; blurring of left optic nerve; numerous indistinct yellowish areas about one-half the size of the nerve head, about left macula, with a few at nasal side of nerve.

Vision: Right eye, 20/30+; left eye, 20/200. Irregular scotoma at left macula.

Dr. Whitney reports that he can find no active lesion in chest, but has slight evening rise of temperature. Von Pirquet, negative; Wassermann, negative.

The tuberculin treatment was started on June 17, 1913, by Dr. Whitney, and carried on entirely by him. The dose was very small, as she showed a general reaction as soon as a larger dose was given.

There was a very rapid improvement of vision, so that on June 27, 1913, vision in left eye was 20/30 plus, and on August 15, 1913, 20/20.

The yellowish areas in choroid are much smaller and faded out to a large extent. January 14, 1914, complained of right eye being blurred.

Vision: Right eye, 20/30; left eye, 20/20.

Has some similar disturbance in choroid about right macula.

January 27, 1914—Vision: Right eye, 20/20—; left eye, 20/20—. April 27, 1914—Vision: Right eye, 20/20++; left eye, 20/20++. January 9, 1915—Has had a cold for a week. Vision: Left eye, 20/30. March 1, 1915, was getting one-fourth milligram T. R. August 8, 1915—Vision: Right eye, 20/20++; left eye, 20/30+.

DISCUSSION.

Diagnosis.—All of these cases showed a focal reaction which seems, to our mind, to quite convincingly justify the diagnosis. In our opinion, no case should be considered as positive unless a focal reaction is obtained at some time. Some of our cases which were considered to be positive clinically were ruled out because of no reaction.

Prognosis.—Several of these cases were given a very grave prognosis, as to even saving the eyeball; and under old methods would, I believe, have been lost. So that I think we can give a better prognosis than before the use of this line of treatment.

Therapy.—While we are aware that those doing sanitarium work are still questioning whether tuberculin is ever of value, and how it acts, we have demonstrated to our own satisfaction that it is of value in eye lesions, and it seems to us that that action is most marked when slight focal reactions occur.

This is in accord with Hertel's experience in a treatment of fifty-seven cases, but opposed to the opinion expressed by Jackson in *Ophthalmic Record* of January, 1916.

It seems to us that this may explain why it is of more value to us than to the internist, for with us we can see the slightest reaction and regulate our dose accordingly, and I think most of us will agree that a slight redness one or two millimeters in diameter in the lung would be exceedingly difficult to follow.

CONCLUSIONS.

First.—That tubercular eye lesions are not as rare as previously thought.

Second.—That a case which shows a focal reaction is almost certainly tubercular.

Third.—That the improvement is most noticeable after slight focal reactions occur.

Fourth—That while the use of tuberculin in internal conditions may be accompanied with danger of an excessive reaction, in eye lesions the reaction can readily be observed and dose graduated accordingly.

Fifth.—That we have increased our therapeutic armamentarium very decidedly in these serious lesions.

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XXVI.

OPTIC NEURITIS FROM SYPHILITIC LEPTO-MENINGITIS.*

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Syphilitic infection of the membranes of the brain most frequently occurs in the arachnoid and pia mater. While syphilis may affect the dura and cause pachymeningitis, it is the condition brought about by leptomeningitis that affects so seriously the nerves of the eye, both optic and motor. While this disease has generally been regarded as a late or tertiary manifestation of syphilis, numerous observations have shown that it may appear in the socalled secondary stage of the infection, and even a few months after the initial lesion. Many writers on the subject designate the disease as gummatous meningitis, applying this term to all forms of syphilitic meningitis. This designation tends to give an incorrect impression of the pathologic findings on autopsy. In addition to focal lesions there may be localized exudates, areas of hyperplastic vascular changes.

According to Ziegler,[1] there first develops in the pia and subarachnoid tissue a circumscribed inflammation which gradually leads to the formation of a gray or grayish red granulation mass rich in cells and containing new vessels. This mass may fill in the space between the sulci, some of it may become organized, while other parts, for instance, the center, may undergo caseation.

The brain substance adjoining such a gummatous formation may also become involved in the process. Such gummatous masses may vary in size from those invisible to the naked eye up to nodules as large as a walnut. The smallest may be seen as points of thickening of the arterial vessel walls. Smaller masses may be absorbed, larger ones may become partly organized or undergo caseation.

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*Read at the meeting of the American Ophthalmological Society, May 9, 1916.

Should the inflammation affect the membranes of the convexity, these gummatous masses fill in the sulci and conform to these spaces. Most writers state that the basilar meninges are more frequently affected than those of the convexity.

LeCount,[2] however, from an examination of fifty-five brains with syphilitic meningeal lesions, thinks it probable that the membranes of the vertex are as frequently affected as those of the base. From his observations he describes three main types of changes in the pia: opacity or turbidity, patches of fibrous thickening, and discrete focal lesions. He found turbidity of the pia in some degree and extent in nearly all cases examined by him. He found this turbidity extending over almost the entire brain, usually with the exception of the occipital lobes, shrouding it as with a veil or sheet. Sometimes it appeared only in patches, and often the base was entirely free, but when found there it was well marked over the pons, the interpeduncular space and the region of the oculomotorius. When the opacity was prominent, the brain, if fresh, had a bluish white dull hue, and appeared as if milk had been poured over it.

In the second type of alteration, together with turbidity of the pia, are found areas of more or less diffuse white or grayish white dense thickening. Patches of grayish, gelatinous, somewhat succulent thickening the size of a pea, or larger, may be seen in any locality, more frequently on the convexity. These gelatinous patches are often located over gaps between the convolutions, and when small partake of the configuration.

In the third type of lesions are found circumscribed homegeneous grayish white or yellowish masses, vaguely outlined, round, stellate or triangular, sometimes flat or elevated, in any locality of the convexity. He also found this form in the fossa of Sylvius, which is often leveled by an opaque thickening. Small nodular elevations, arranged, bead-like, in short chains or ridges, were also observed.

Changes in the walls of vessels are also observed, particularly the basilar vessels. The walls show areas of infiltration and thickening. LeCount observed that rarely there was only one type of meningeal alteration; usually several were present in the same brain. If nerves lie in the region of inflammation they become affected either by the pressure of the exudate which may cause edema of the nerve, or by the development of a perineuritis or interstitial neuritis. Such inflammatory infiltration may be followed by more or less extensive development of connective tissue which results in atrophy.

It is in cases of meningitis affecting the base, particularly the region of the chiasm and the interpeduncular space, that involvement of the nerves of the eye occur. Lesions of the membranes of the convexity, as a rule, cause changes in the optic nerve only when by the development of large, gummatous masses the intracranial pressure is increased and papilledema or choked disc results. This is similar to the change in the nerve that results from brain tumor. In the basilar form the furrows and depressions of the base of the brain are filled with a gelatinous, sometimes firm, bacon-like new formation, thicker in some places than others. This new growth is found particularly in the neighborhood of the chiasm, but may extend backward even to the pons. It may surround the different parts of the optic tract and the motor nerves to the eye. The presence of this inflammatory mass in the meninges may cause an edema of the optic nerve, expressing itself in the form of a choked disc, or there may be a true inflammation of the nerve itself or its coverings that may extend from the brain, involving the portion within the canal and even the orbital portion of the nerve. Therefore, one may properly speak of a leptomeningitis of the orbital portion of the optic nerve.

Usually, however, it is the intracranial portion of the optic tract that is affected, and when any part of this becomes involved in the inflammation, the process may begin with an edema of the nerve or its sheath that would explain the sudden blindness in one or both eyes or in part of the field that is observed in some cases. Such attacks are often transitory, disappearing for a time, then recurring. With the continuance of the trouble there develops a perineuritis associated with an interstitial neuritis, in which there is an infiltration of the nerve itself with round cells and the formation of a granulation tissue which subsequently organizes and causes atrophy.

As to the frequency of lesions of the optic nerve occurring in syphilitic meningitis, valuable information is given by Uhthoff, who in a study of one hundred cases of syphilis of the central nervous system found that choked disc, or atrophy following it, occurred fourteen times. Optic neuritis or subsequent atrophy occurred twelve times. Simple atrophic change in the nerve occurred fourteen times. In fifty-two of the cases the ophthalmoscope showed a normal condition of the fundus, but of these, five showed homonymous and two temporal hemianopsia. In three of the cases coming to autopsy there were no disturbances of vision and no ophthalmoscopic findings, although there were distinct pathologic changes in the basal optic tracts. As to the relative frequency of "choked" disc or optic neuritis in this condition, Uhthoff has found that when choked disc occurs it is caused in sixty-five per cent of cases by gummas of a tumor-like size, whereas in twenty-three per cent the cause was basilar meningitis.

In many such cases, therefore, we will see choked disc that cannot be distinguished clinically from that seen in intracranial neoplasm. In others there is a distinct optic neuritis, while in a number no ophthalmoscopic signs will be present. In the last named group there may not be lacking defects in the fields as indicative of change in some part of the optic tract. Field defects vary from symmetric contraction or sector losses to hemianopsia or even complete blindness. In one eye there may be complete blindness, in the other a sector defect or hemianopsia. This variability in regard to fields is frequently a noticeable feature of such cases.

GENERAL SYMPTOMS.

As to general symptoms, according to Oppenheim, headache is one of the most constant; but even this may be slight or entirely lacking.

In some cases it is severe, often with exacerbations at night, and at times may be accompanied with vertigo or vomiting. Naturally, in severe cases there might be attacks of convulsions or periods of unconsciousness. Psychic manifestations may be noticed, such as mental dullness and confusion, apathy, loss of memory, and even mania. Disturbance of speech, aphasia, apoplectiform attacks, paresthesia, hemiplegia, deafness, difficulty in swallowing, are some of the numerous symptoms that have been recorded in such cases, some of which may be occasioned by the involvement of the vascular system.

But the most striking characteristic of such cases, according to Wilbrand and other observers, is the variableness, the inconstancy of the symptoms, and their sudden changes. This is also illustrated in the eye symptoms, which vary sometimes as noticeably as do the general manifestations. The suddenness of blindness in one or both eyes, and at times rather prompt recovery, the appearance and disappearance of blind areas in the field, the paralysis of motor nerves of the eye, followed by recovery, are examples of the fickleness of the process in this disease. The noticeable lack of symptoms of the nervous system in certain cases, and the insidious nature of the trouble, add to the difficulty of diagnosis when clinical history or other signs of syphilitic infection are not present. The valuable discoveries of recent times in regard to the etiology, diagnosis and treatment of syphilis have proved of great benefit in elucidating conditions of the central nervous system that formerly presented baffling problems.

Before our diagnosis was aided by the Wassermann and Noguchi tests and the important cytologic and chemic findings in the spinal fluid, we were compelled to rely on the clinical manifestations of the disease, which so frequently are obscure and uncertain. Not that these tests are absolute or infallible, but they have shown their value so frequently where clinical evidence was lacking, that they have become indispensable adjuncts and mark an era in the diagnosis of syphilitic infection.

The prognosis as to vision is usually uncertain, but will depend partly upon the promptness of the diagnosis and the amount of damage the optic tract has suffered before effective treatment is begun. The remarkable instances of recovery of vision (in some cases complete) where the ophthalmoscopic appearances indicate extensive atrophic changes indicate that the hope of cure is not to be given up, even if complete blindness has supervened. Energetic treatment may save a fair degree of vision.

I should like to record the following cases, which I believe to be syphilitic leptomeningitis, and which illustrate the insidious nature of the disease, the suddenness of development of the eye symptoms, and the prompt response to treatment that may sometimes follow.

Case 1.—Miss S. L., aged twenty years, was admitted to the Presbyterian Hospital, August 15, 1914, with the history that on the 3rd of August the right eyelids began to swell at the nasal side, and this swelling increased so that in two days it was impossible to open the eye. The physician who examined her observed that when the lids were separated the upper half of the visual field was blind. The following day the left eye became blind, the nasal half of the field being first affected. This was preceded by an edema of the lids beginning at the nasal side, as had occurred on the right side.

These phenomena were accompanied by some headache, not intense, and by slight mental confusion, but no other marked symptoms. In the preceding May she had some trouble of the throat, which seemed to be swollen so that she had difficulty in swallowing; and her father stated that during and after this attack she had considerable pain in the joints, and her neck was swollen. There was also some diarrhea. Her father and mother were perfectly healthy, and have several healthy, well-formed children, of which this daughter is the oldest. The mother had never had miscarriages, nor did she nor the father give any history or evidence of being luetic. Wassermann test of the blood of each of them was negative.

The patient herself was a well-formed girl of about one hundred and ten pounds in weight, with no history of previous illness except that mentioned, and no clinical history of luetic infection. Examination showed the eyelids of both eyes so swollen that she could only open them slightly. This swelling was due partly to edema and partly to engorgement of the veins, for the nasofrontal vein on each side was considerably distended, and the superficial veins of the conjunctiva were prominent. There was a slight degree of exophthalmus, but no pulsation of the eyeball over the distended veins. No bruit could be heard on auscultation.

The external appearance of the eyeballs was normal except for the distended veins. Mobility was restricted so that the abduction of the right eye was about thirty-five degrees, of the left about twenty-five or thirty degrees.

The eyes could hardly be elevated above the horizontal, but movement downward was only partially affected. There was only a slight degree of convergence when she was asked to look at the end of her nose, and with this effort the pupils scarcely changed their size. The pupils were evenly and widely dilated to about eight millimeters, and did not react to the strongest light. Vision of each eye was zero. Ophthalmoscopic examination showed the media perfectly clear. Both optic discs were blurred and swollen to about 1 D., and the physiologic depression was obliterated. The retina immediately around the discs was somewhat swollen, the veins were double the normal width, engorged and tortuous in a vertical plane for a distance of one or two disc diameters from the margin. The arteries were about normal in width, but Dr. Allen, who had referred the case, stated that the arteries had been narrower when he had examined her soon after the attack occurred. There were no hemorrhages in the retina, nor were any seen at any time. Aside from the change in and around the discs, the fundus was of normal appearance in each eye. Physical examination of chest and abdomen revealed no abnormality.

Dr. Rothstein, neurologist of the Presbyterian Hospital, kindly saw the case in consultation, has examined her repeatedly, and has directed much of the treatment. I am indebted to him for his record of examinations and subsequent treatment of the case. His examination showed: Right corner of mouth a little lower than the left, but movement is equal on both sides. The tongue when protruded deviates slightly to the left ,and stands in a somewhat uneven plane. Right half of maxilla a little lower than the left. Restricted mobility of the eyes, as mentioned above. No paralysis in arms, and muscular power of hands normal. Below the knee the sensation to sharpness is lessened so that the patient is uncertain whether she is touched with the point or the head of a pin. Similar uncertainty on stimulation to the arms. Sensation decreased on dorsum of feet, but not above the ankles. Sensation is slightly decreased on the dorsum of the hand. Pinching the skin and calves of legs slightly painful. Babinski plus. Patellar and achilles reflexes lively. Slight tendency to clonus on the right side. Able to walk, but is unsteady; there is a tendency to fall to the right. Spinal fluid under increased pressure; ten cubic centimeters of clear fluid was withdrawn.

Wassermann test of blood, August 21st, showed weak positive. Examination of cerebrospinal fluid showed cell count of twenty. Nonne negative. Wassermann negative. Wassermann test of blood August 24th showed positive plus. Blood count was normal. Hemoglobin normal. Tuberculin tests were negative.

Dr. Friedberg. rhinologist and laryngologist at the Presbyterian Hospital, found the nares free, and all accessory sinuses clear with the exception that the right maxillary sinus showed slightly darker under transillumination and was irrigated; no pus was found, but only a few flakes of mucus.

The diagnosis was made of syphilitic basilar leptomeningitis, and treatment by inunction of mercury was given.

September 5, 1914. Complained of roaring and ringing tinnitus, with some deafness and a confused feeling in the head.

September 7, 1914. Deafness was marked in both ears, and she could only hear a loud noise at a distance of a few feet. Was excitable and cried a great deal and complained of great confusion and roaring in the ears. Bone conduction for sound much impaired. Both drum membranes were clear and apparently normal except for slight retraction. This distressing condition lasted for nearly a week, and then gradually her hearing was regained, and within another week returned to normal. The inflammation of the optic nerve gradually subsided and was followed by atrophy, the optic discs becoming very pale. Within a week after treatment was instituted she began to perceive light with the right eye, and gradually regained a degree of qualitative vision in the inferior temporal quadrant of the right field. There was no improvement of vision in the left.

September 30, 1914. She received 0.45 gram neosalvarsan intravenously, and in the next month she received three more doses of 0.6 gram, 0.75 gram, 0.9 gram in the same manner.

She was discharged October 31, 1914, very much improved as to her general condition. She was able to recognize large objects in her right inferior temporal visual field and to distinguish colors, but, as there was no central vision, it was difficult to chart the field. Roughly, her field occupied an area on the temporal side about fifteen degrees above the horizontal to about forty-five below the horizontal plane, and extended from about fifteen degrees temporally from the fovea to nearly normal limits. She returned for observation and treatment January 13, 1915. General condition was much improved, and she had gained over twenty pounds in weight. Had not been troubled with headache, and her sleep was better. Her vision was clearer, although the field had not noticeably enlarged. Colors in her field were more readily recognized, and she could even read letters about two centimeters high several feet from the eye. The optic discs were very white. Cerebrospinal fluid was clear with cell count of one, a negative Nonne and a positive Wassermann reaction. She was given two doses of neosalvarsan, 0.75 gram, increasing doses of iodid potassium and discharged in one week.

Returned to hospital again March 25, 1915, in good general condition, but with sight about as before. Spinal fluid was clear, with cell count of three, and a negative Nonne and a negative Wassermann reaction. She received two doses of 0.9 gram neosalvarsan during the week she remained.

Entered the hospital again June 30, 1915, for observation. No change in general condition. Vision same as before. Wassermann tests of blood and spinal fluid gave negative reactions. She has not been seen since, but is reported to be in about the same condition as when last examined.

In this case the syphilitic exudate at the base not only pressed upon the chiasm and oculomotor nerve, but probably interfered with the return flow of venous blood through the cavernous sinus, thus causing the marked engorgement of the veins of the lids and eyeball.

Case 2.—Mrs. F. K., aged forty years, consulted me first on March 9, 1916, stating that for the past month she had noticed spots dancing before the right eye, with occasional flashes of light. At times she had the sensation that she was looking through broken or splintered glass with that eye. A few days before seeing me she noticed that she could not see objects in the right inferior nasal field, and this alarmed her considerably. Her previous health had been fairly good, except that she has had several pelvic operations. During this period of failing vision she had some headache, mostly frontal and on the right side, but not severe. She had been under considerable nervous strain from taking care of her husband, who has tabes, and an epileptic sister. Examination showed right eye vision, 20/20—2; left eye vision, 20/20—2. Right pupil was larger than the left, and reacted more slowly to light and accommodation.

Perimetric examination showed left field for white normal, red and green somewhat contracted. Right field showed a marked defect in the inferior nasal quadrant and the color fields very much contracted. (See chart, Fig. 1.) Tension in each eye normal—eighteen millimeters by tonometer. Pupils dilated evenly with homatropin. Ophthalmoscopic examination showed media clear and fundus of each eye normal. A rather large physiologic cup was present in the right optic disc. A Wassermann test had been made before she was sent to me that had given a negative reaction. Four days later she called me by phone to tell me in alarm that she had become completely blind in the right eye. The blind area had increased each day, she said, until on March 12th she could not see with that eye. There were no spots before the left eye, but she had the same sensation of looking through broken glass that had preceded the trouble in the right eye, which was sufficient to heighten her alarm.

I saw her the following day, and found the right pupil widely dilated and the vision of the right eye zero. There was not the faintest perception of the strongest light, nor the slightest direct response of that pupil to such light, although its consensual reaction was prompt and almost normal. Ophthalmoscopic examination revealed no change in the optic disc nor in the fundus. The left eye had normal central vision and field about as before. I had her consult Dr. Rothstein, who, in office examination, found she had distinct decrease of sensation of touch and pain in a girdle form at the level of the mamma on the right half of the chest. Reflexes were increased. There was a dubious Babinski on both sides, and he expressed the opinion that there was localized meningitis, possibly syphilitic in character, although the clinical signs of lues were lacking and there was a report of a negative Wassermann.

As the case seemed urgent, she was given hypodermically 0.3 cubic centimeter of forty-five per cent emulsion of mercury. There was considerable difficulty in persuading her to enter the hospital for further examination, and she did not go until eight days later, March 23, 1916. In the meantime distinct improvement took place. She stated that within an

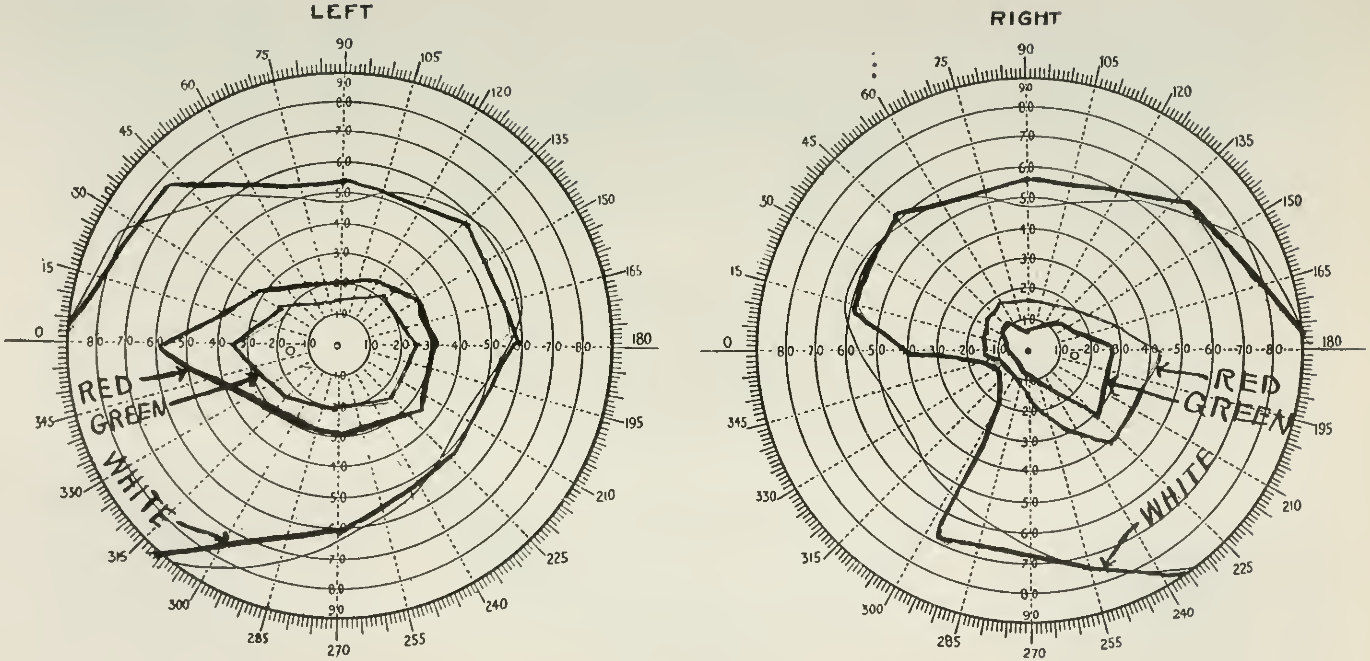

FIGURE 1.

Mrs. F. K. March 10, 1916. Right eye, vision, 20-20-- 2; Left eye, vision 20-20 -2. Good light. One centimeter square object.

hour after the injection of mercury the headache disappeared. On March 18th, four days after treatment was begun, she could distinguish hand movements close to her eye, and there was a slight reaction of the right pupil to light. Improvement then became more rapid, so that by March 21st there was vision of 20/70. Right pupil reacted rather sluggishly. Consensual reaction much stronger than direct; with closure of the left eye the right pupil began to dilate. Fields taken at this time showed marked contraction for white and colors. (See chart, Figure 2.)

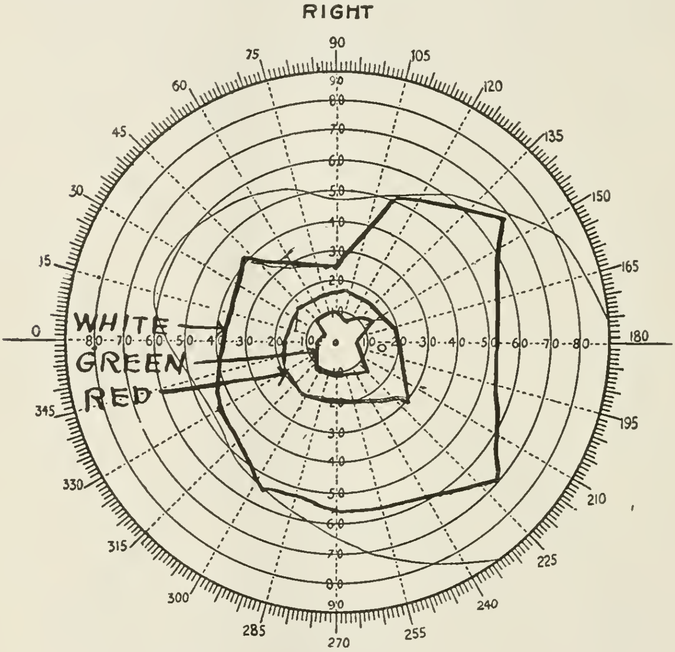

FIGURE 2.

Mrs. F. K. March 21, 1916. Right eye, vision 20-70 slowly. Good light. One centimeter square object.

On March 23d she entered the hospital. Examination of blood showed distinctly positive Wassermann. Spinal fluid was clear. Cell count two, Nonne very weak, Wassermann weak positive. Further examinations showed that knee jerk, ankle jerk, elbow and wrist jerks and abdominal reflexes were all lively and equal on both sides. Blood count and hemoglobin index were normal. Wassermann test of blood gave a positive plus reaction. The cerebrospinal fluid was clear with cell count of two and a very weak Nonne test for globulin. The Wassermann test, however, was a positive plus. Treatment was continued, and by March 28th right vision had improved to

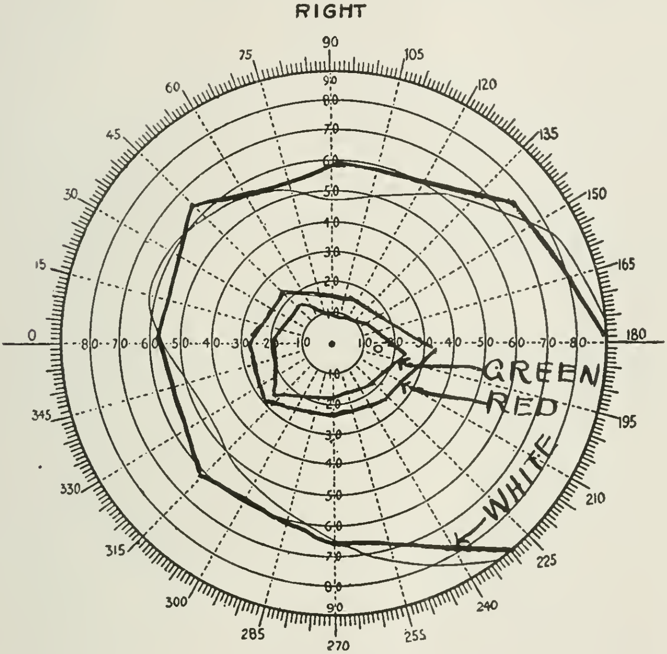

FIGURE 3.

Mrs. F. K. April 20, 1916. Right eye, vision 20-30. Good light. One centimeter square object.

20/30, where it remains at the present time. Fields taken April 20th show a return of white to normal and a contraction of red and green. No change has yet been observed in the normal appearance of the optic disc and fundus of the right eye.

Patient stated on April 20th that there was a faint bluish appearance of objects viewed with the right eye, and also a faint hazy area in the field below the center, but this could not be detected by the perimetric test. On April 30th this bluish appearance had changed to a grayish one, and she was still conscious of a hazy area in the lower fields, but this could not be detected on the perimeter.

It is too early to say what the ultimate outcome of the case will be, but it illustrates well the sudden onset of partial, then total blindness with prompt recovery that may take place in syphilitic meningitis. The blindness in this case might have been due to an edema into the nerve which was favorably affected by the prompt administration of mercury. The recognition of the syphilitic taint in a case where there had been a previous negative Wassermann, and in which clinical data were absolutely lacking, has an important bearing on the future of the case. The absence of ophthalmoscopic signs is another noticeable feature, but it may be that evidence of optic atrophy may appear later.

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XXVII.

MINERS' NYSTAGMUS.*

FREDERICK L. HOFFMAN.

INTRODUCTION.

Miners' nystagmus is the result of a peculiar form of eye-strain, which often results in impairment of vision and a consequent diminution of the wage earning capacity of the workman.

Historically it has been pointed out by Shufflebotham[73] that "This disease was first recognized by Gillett, of Sheffield, about 1854, although no case was mentioned in medical literature until 1861, when the symptoms were described by De Conde, a Belgian physician. Cases were reported by Pepp Müller as early as 1860, by von Graefe in 1873, and by Bell Taylor, of Nottingham, and by Nieden in 1874. In this country (England) we are indebted to a very large extent to the observations and writings of the late Simeon Snell and for his pioneer work on this many sided disease; in France Dransart occupies a similar position." In the treatise on "The Effects of Arts, Trades, and Professions," by C. Turner Thackrah, published in London in 1832, it is stated that—

"The complexion of the colliers, even after the removal of the dirt, is generally sallow and unhealthy. Their eyes, from the swelling of the lids, appear small, are affected with chronic inflammation and intolerant of full light. * * * Sickness and vomiting sometimes affect persons at their commencing the employ; and many, after a few years' trial, are obliged, by the injury which their health has sustained, and especially by the weakness of their eyes, to leave the mine."

According to Greer,[43] an authority on industrial diseases and accidents, miners' nystagmus occurs in five per cent of all miners, but it is quite probable that the reference is to European coal miners rather than to men employed in all branches of the mineral industry. According to the same authority, miners' nystagmus "is associated with a twitching of the eyelids and with considerable diminution of the range of movement of the eyes, and is particularly liable to occur in patients whose vision is subnormal owing to errors of refraction, especially astigmatism. It causes much inconvenience to those suffering from it and prevents them from following their usual occupation as, owing to the movements of the eyes, everything at which they look appears to be in a state of perpetual motion, and in consequence their visual acuity is more or less reduced. When the movements cease the vision becomes as good as it was previously."

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Barnett,[5] with reference to the British workmen's compensation act of 1906, states that nystagmus "is a condition often found in miners owing to excessive strain of the eye. The cause of the affection is the constrained position of the eyes, producing chronic weariness. It is usually present in those miners engaged in 'kirving' or bottom-holing a seam of coal; in doing this they have to lie in a very strained position, striking the coal with a horizontal swing of the pick, and having to keep their eyes fixed on one spot, using the elevator muscles constantly."

The symptoms of the affliction are stated by Barnett to be as follows:

"There are usually objects dancing before the eye. There is oscillation of the eyeball, headache is often present, and giddiness sometimes causes the miner to stumble. The movements of the eyeball are rotary and to and fro, rarely vertical; the rapidity of the motion may be great. Tremors of the muscles of the head and face are often associated with the trouble."

SOURCES OF INFORMATION.

The literature on nystagmus is considerable, but is limited chiefly to contributions to medical and mining periodicals. A complete treatise on the subject of miners' nystagmus was published in 1894 at Wiesbaden, by Nieden.[58] There are numerous descriptive accounts of individual cases of miners' nystagmus, most of which confirm the view that the immediately responsible cause for the disease is the defective illumination under which underground mining is frequently carried on. There are other forms of nystagmus, both congenital and hereditary, and some cases of the disease have been reported for men employed in other occupations than mining, including a case of nystagmus in a compositor, reported by Snell,[74, 77] in 1890. As pointed out by Thompson,[84] in his recent work on occupational diseases—

"Nystagmus as an occupational symptom is not alone confined to miners, and may develop in those who are compelled to give close visual attention to constantly moving objects. For example, Dr. Collie, of the British factory inspection service, found that 28 per cent of 516 female sewing machine operatives had slight grades of nystagmus from fatigue of the eye muscles in following the work through the machine. Exceptional cases have occurred among compositors who kept their copy above the eyes and threw the head backward to glance at it."

According to the same authority, the symptom of rapid oscillation of the eyeballs, typical of miners' nystagmus, "is due to picking at overhead coal, which requires strain of the eye muscles, the eyes being constantly directed both upward and to one side. It is therefore limited to those who handle the pick exclusively. The symptom usually subsides in time after the form of work has been changed. It is at present a rare phenomenon, owing to two causes—first, the increasing introduction of machine methods and, secondly, the operation of the gross weight law, whereby miners are paid for the gross tonnage of the coal mined, not on the basis of the size of the nuggets. When the latter system prevailed the miners sought to increase their earnings by carefully picking out large fragments of coal, which involved the ocular strain."

Thompson quotes Browne and Mackenzie to the effect that—

"The contributing factors in producing this symptom are: Inadequate light, errors of refraction, straining of the extrinsic eye muscles, and neurotic temperament. Ninety per cent of their patients had errors of refraction. The symptom is often attended by severe pains in the head and eyes and by quivering of the eyelids. The miners find some relief from the affection by walking with the eyes directed downward. No special treatment, except rest, is of any avail, and after a prolonged period spontaneous recovery may take place, which may be partial if not always complete."

The following suggestive description of nystagmus is by Louis:[54]

"Probably the most unhealthful part of the coal miner's work consists in 'kirving' or undercutting the coal, in doing which the miner has to lie on his side on the floor of the coal seam, swinging his pick with a peculiar sideways stroke over his head, till he has cut out a narrow groove some 3 feet deep below the overhanging mass of coal. Work in this constrained position is necessarily harmful to some extent. Its effect has been most noticed as affecting the nervous system, and especially the nerves of the eyes, the disease known as miner's nystagmus having been often ascribed to it. Cases of miner's nystagmus occur, however, also among miners who do not have to kirve, and it may well be due in great part to the poor light obtainable in so many cases underground, especially when safety lamps are used, and the consequent strain on the eyes. At any rate this seems to be the opinion of several who have suffered from this complaint."

OCCUPATIONAL EYESTRAIN.

In the same work, in connection with a discussion of eye diseases and eye accidents in relation to industrial occupations, Snell,[77] a recognized authority on ophthalmology, contributes an extended discussion on nystagmus, not only among miners, but also among persons employed in other occupations underground. The findings and conclusions of Snell have not been accepted in their entirety by other authorities on the subject of nystagmus, but they are given in full so as to provide the necessary basis for comparison with divergent views subsequently to be quoted.

"Coal miners, as a result of their employment, are especially prone to a peculiar affection of the eyes called 'nystagmus' (miners' nystagmus), which is characterized by oscillations of the eyeball. The sufferer, too, complains of objects dancing before his eyes. In this disease objects appear to move either in a circle or an ellipse. Headache is often present, and especially giddiness, which sometimes causes the miner so to stumble about that he is compelled to leave his work in the mine. The movements of the eyeball are chiefly rotatory; to-and-fro oscillations are sometimes superadded. These are rarely vertical, but the rotatory are seldom, if ever, absent. The rapidity of the ocular motions varies greatly; from 60 to 150 motions may be counted in a minute. I have observed them as frequent as 350. Both eyes are affected, but the rapidity of movements may vary in the two eyes. The more rapid the oscillations the less extended is the excursion of the globes. The oscillations are arrested by turning the gaze downward below the horizontal line, and miners often learn to rest their eyes in this way. Looking upward, and especially obliquely to one side or the other, rapid movements of the head, lowering of the head, and suddenly raising it are means of increasing the rate of movements of the eyeballs, or, in other cases, of rendering them evident. Placing the patient in the position he would assume at his work is another method. Tremors of the head (noticeable to the hand placed on the head), of the eyelids, and of the muscles of the face or neck are often associated with nystagmus, and so is torticollis or 'wry neck' in some cases. Night blindness has been alleged to be present, but there is some reason to dispute this. The nystagmus alone is a sufficient cause for any difficulty in seeing in a failing light. Errors of refraction, myopia, hypermetropia, and astigmatism are often present, but bear no causal relation to nystagmus; visual acuity is generally unaffected. Color perception is good, and, so far as the movements of the eyeballs permit of testing, the field of vision is normal. The onset of the disorder is often brought about by some attack of illness. It is generally met with in men who have worked in the mine for some years. Ninety per cent of cases occur in persons from 25 to 45 years of age."

Nystagmus is found chiefly in miners who work at the coal face in a more or less constrained position of the body and the eyes. The methods of mining in England differ somewhat from those in this country, especially in details that have an important bearing on the occurrence of nystagmus, and therefore it seems appropriate to include a brief abstract from the article of Snell regarding conditions under which nystagmus in English coal mines is most likely to occur. The abstract follows:

"It is desirable to get coal in as large pieces as possible, and to do this they undercut or 'hole' the seam. A man sits with his legs crooked up, lying almost on his side, and strikes the coal with a horizontal swing of his pick at the bottom of the coal seam. He will cut away the coal to a height of 18 inches to 2 feet, and then as he gets deeper in he will draw his body under the coal, lying on one side or the other. This is called 'holing,' and sometimes the undermining may be continued from 2 to 3 feet to as much as 7 or 8 feet; the distance varies considerably. As he proceeds with his work the miner applies timber supports to keep the coal from falling. This just described is called 'bottom holing,' but the seam may be attacked in the middle (middle holing) or at the top (top holing). A miner engaged at this work will direct his gaze to different parts as it becomes necessary for him to strike, for the eyes will follow the pick point, but the tendency will be for the gaze to be directed upward (using the ocular elevators) more or less obliquely. He will lie sometimes on one side and sometimes on the other. His legs will be crooked up, his head thrown back and flexed more or less on the shoulder beneath. * * * Ninety-eight per cent of all cases of nystagmus coming under my notice have been in men occupied at the coal face and more or less engaged at this kind of work."

NYSTAGMUS A DISEASE OF COAL MINERS.

Regarding other underground occupations liable to nystagmus, the disease appears to be rare among them. Thus, for illustration, overseers whose work requires the inspection of underground conditions, both as regards freedom from gas and the security of the roof of the room or chamber in which the work is being done, suffer occasionally from nystagmus, according to Snell, probably because of the fact that their particular duties necessitate "the same upward and oblique direction of the gaze." He points out, however, in this connection that frequently the men employed as overseers have previously worked as coal miners, and he therefore concludes that, as a rule, all cases of nystagmus occur in those who are either working or have worked as coal miners, or who work in such positions as to require an upward direction of the eye for more or less prolonged periods. He also concludes that the causation of the affection "must be sought in this constrained position of the eyes by which chronic weariness is induced in the elevator muscles of the eyes. Like effects are found in other muscles of the miner, producing wry neck, tremors of the head, and quivering of the eyelids. It is thus similar to other occupational neuroses and in the same category as those found in writers, compositors, telegraphers, and many others."

BEARING OF INSUFFICIENT ILLUMINATION.

As regards the important question of insufficient or imperfect lighting, the opinion is expressed by Snell that nystagmus occurs among miners working with all kinds of lighting, and that he has met with it among those working with safety lamps, candles, large open lamps, as well as when the artificial light was really good. He concludes, however, that there are reasons "for believing that the strain is greater the worse the light, and that nystagmus is met with in greater frequency under such conditions." He quotes Nieden to the effect that 5 per cent of coal miners suffer from nystagmus, and he adds that his own observations support this view, but that in some places the percentage is higher. For illustration, among men working at a colliery with candles only, he found that 6 out of a total of 140 were absent from work on account of nystagmus, and that this represented only a part of those who, on examination, would have shown to have been actually affected with the disorder. Snell quotes Romiée, a Belgian authority, to the effect that the percentage of nystagmus cases was as high as 20, but he adds that this probably includes the less marked cases.

PROGNOSIS, TREATMENT, AND CURE OF NYSTAGMUS.

The prognosis in nystagmus, according to Snell, is usually good, evn for old-standing cases, if the directions as to a change of work are followed, and in such cases the nystagmus will usually disappear. As to treatment, particularly with reference to a change of occupation, Snell points out that —

"In some cases it will suffice if the patient ceases from coal getting, without altogether stopping work in the mine, but generally it is advisable, especially if the nystagmus be of a high degree and of some standing, to recommend cessation altogether from work underground. After relief has been effected, return to the mine is practicable, provided the head can be kept straight and the upward trend of the eyes avoided. Resumption of the old kind of work is followed, sooner or later, by a recurrence of the symptoms. Medicinal treatment is also of service."

Finally, as regards the occurrence of nystagmus in other occupations than mining, Snell states that he observed the affliction, among others, in "compositors, metal roller, plate layer, plank cutter, saw maker, sanitary tube maker, fitter, iron founder, cage worker in a mine, glass manufacturer, youth in confectionery warehouse, and a man engaged in hanging up harness, and in another employed at the screens at the surface of a coal mine."

All of these instances, Snell points out, occurred under circumstances comparable to mine work, particularly as regards the strain upon the elevator muscles of the eyeball, on which, in his opinion, the degree of illumination had no effect. This conclusion, however, is not generally accepted.

FREQUENCY OF OCCURRENCE.

The first practical question is the probable number of miners affected with nystagmus. There are, unfortunately, no conclusive data on this subject, and the results of the only investigation that appears to have been made in this country—that is, in the State of Illinois—proved negative. According to the census of 1910 the number of men employed in coal mines in the United States was 613,519. If the proportion of miners affected with nystagmus were 5 per cent, the number of such cases in this country would be 30,676. In view of the paucity of references to nystagmus in American medical literature, it is extremely doubtful whether this proportion holds good for this country, as, seemingly, there have been few cases in American mines, although no thoroughly qualified ophthalmic study has yet been made.

One of the most important contributions including American data was published some years ago by Nieden,[58] of Bochum, the center of the coal mining district of Rhenish Prussia. The study includes an examination of 7,500 miners. The pure rotatory form of nystagmus was found to occur in 72 per cent of the cases, the oscillating form in 12.5 per cent, and the mixed form in 15.5 per cent. Nieden questions the accuracy of Romiée's conclusion regard a proportion of 20 per cent of nystagmus cases; and his own investigations made for the purpose of determining the facts, at least for the mining districts of Rhenish Prussia, were made with characteristic German thoroughness, and the existence of nystagmus in an acquired form was accurately determined in 299 cases out of a total of 7,416 miners, or 4.03 per cent.

On examination of 2,003 miners returning from work he found a proportion of 3.2 per cent suffering from nystagmus, whereas 1,913 men on commencing work were found to suffer in the proportion of 2.9 per cent. This result applies to a particular section and is, therefore, not strictly comparable with the total for the entire group examined, for which the combined percentage of nystagmus cases was 4.03. The difference as regards the occurrence of nystagmus on entry or exit cannot be considered of great importance, but a more extended inquiry might disclose a more pronounced deviation from the normal.

Nieden adds an extremely interesting comparison of the frequency of nystagmus, based on his own examinations of miners and the results of his own private practice. Out of 3,017 miners requiring attention on account of eye troubles during a period of seven years, there were 172 cases of nystagmus, or 5.6 per cent. Against this proportion Nieden quotes 29,640 private cases of eye afflictions, out of which only 0.54 per cent were cases of nystagmus. In his opinion, therefore, the high proportion of 20 per cent as given by Romiée was not sustained by the experience in the Bochum mining district.

It is quite possible, however, that wide variations would be found to exist in different coal fields, for it is safe to maintain that the disease in the coal areas of the United States is relatively rare; in fact, Nieden points out that, according to his own investigations, most of the cases of nystagmus occurred among miners working in narrow seams, and that miners in some sections, where mining conditions were better, were practically free from the disease. Thus, for illustration, he determined that in the coal seams north of Bochum 7 per cent of the miners were afflicted with nystagmus, whereas in the coal seams south of Bochum only 0.25 per cent were affected. Upon further inquiry, however, he ascertained that in the northern coal seams the use of safety lamps was practically universal, whereas in the southern coal seams most of the men worked with open lamps and therefore under better conditions as regards illumination. He determined, by means of strictly scientific methods, that a miner using a Davy safety lamp during an eight-hour period worked under about one-third the amount of illumination normally provided by an open lamp. On examining the records, he found that of 117 miners treated by him on account of nystagmus, 107, or 91.4 per cent, used safety lamps, whereas, in two mines using open lamps and employing 772 men, only 0.35 per cent was found to be afflicted with nystagmus. He points out, however, that it was not only the insufficient illumination derived from the Davy lamp, but also its imperfect construction as regards the largest amount of possible effective illumination that was to be held responsible as a causative factor in nystagmus.

The relative frequency of this disease is referred to by Shufflebotham as follows:[73]

"Dr. Court has stated, as a result of the examination of several thousands of workmen, that 35 per cent of coal getters are subject to this disease to some extent. Snell estimated that 5 per cent of all colliery workers were affected, but he did not discriminate between different kinds of work in the coal pit. Nieden, who examined nearly 30,000 coal miners, agrees with Snell that the frequency of nystagmus in underground workers is somewhere about 5 per cent. In the north of France Dransart and Famechon have given 10 per cent as the number affected. Romiée and Thiebert, of Liege, during 1908 and 1910 examined 5,000 workmen in 27 collieries. More than three-fifths were coal getters, and on the average 21 per cent were affected with symptoms of nystagmus; in collieries lighted by lamps burning heavy oils 37 per cent of the coal getters were affected. Romiée had made a similar inquiry in the same district in the years 1877-78, and the result of his later inquiry was to show a marked diminution in the number of cases as well as in the severity of the symptoms. Stassen, who in 1909 examined 3,385 colliers descending into the pit, and also on their return to the surface, found that 15 per cent of the workers were affected before commencing their work and 22 per cent at the end of the shift.

Roger, of Hondeng-Geognies, as a result of examining over

7,000 workmen, came to the conclusion that 17.5 per cent were suffering from nystagmus. Liebert, the chief inspector of mines to the Belgian Government, found different percentages of miners affected in different districts. In one series of examinations which he conducted with the help of Romiée and Thiebert he found that of 305 workmen examined in one pit 73 were affected with miners' nystagmus, giving a percentage of 23.9, and he refers to a memoir dealing with 3,685 workmen, among whom 704 showed symptoms of this disease, or a percentage of 19.1."

OTHER EYE DISEASES OF MINERS.

Aside, however, from the question of imperfect or insufficient illumination, Nieden[58] found that in a preponderating number of cases the miners suffered from other eye afflictions, including trachoma, dimness of the cornea, chronic iritis, iridochoroiditis, atrophy of the optic nerve, etc., all of which, of course, would predispose to nystagmus under the special conditions of underground work at the face of the seam. The only specific suggestion that he makes as regards prevention is the necessity for better artificial illumination by means of safety lamps, and he refers to electric mine lamps used in the Newcastle (England) district, but these, of course, do not indicate the presence of dangerous gases.

CONCLUSIONS OF LINDEMANN.

On the occasion of the Fifteenth International Congress on Hygiene and Demography, Lindemann,[50] chief medical director of the Bochum Miners' Union, contributed an address on the occupational diseases of miners, in which the subject of nystagmus is briefly referred to. He admits that the disease is of comparatively common occurrence, and points out that general debility, anemia, and alcoholism may be contributory causes, aside from the high underground temperature and excessive muscular strain. He dissents from certain conclusions by Snell with regard to the inability of miners suffering from nystagmus to recognize in time the blue cap on the safety lamp, indicating dangerous gaseous conditions. According to his own investigations, miners suffering from nystagmus were, without exception, able to determine the presence of fire damp to the extent of 2 to 3 per cent with absolute certainty. He refers to the rule of the Allgemeiner Knappschafts Verein zu Bochum (Bochum Miners' Union) (which is the compulsory miners' insurance association) that miners afflicted with nystagmus are not permitted to work underground, and that nystagmus itself entitles to compensation, both as regards money payments for support and medical treatment, as well as an invalidity pension. He states that an additional rule is to the effect that miners whose normal vision has been reduced 50 per cent are not permitted to work underground. As regards treatment, he states that good results follow only when underground work is discontinued at an early stage of the disease.

In this connection a brief reference may be made to the recently published experience of the Bochum Miners' Union[1] for the year 1912, as regards the frequency of nystagmus as a cause of invalidity. Out of 3,605 cases of invalidity, 649, or 18 per cent, were on account of nystagmus, and 75, or 2.1 per cent, on account of other diseases of the eye. As the membership of the fund for the year 1912 was 376,000, this would be equivalent to an invalidity rate on account of nystagmus of 1.73 per 1,000 employed.

The foregoing preliminary observations emphasize the practical importance of nystagmus wherever the disease prevails to a considerable extent. A strictly localized investigation should limit itself to a mining district in which the miners use safety lamps and undercut the coal with the pick.

NYSTAGMUS AS A MINING PROBLEM.

Nystagmus is not referred to in the "Report on Mining Methods and Appliances Used in the Anthracite Coal Fields,"[21] published by the Second Geological Survey of Pennsylvania in 1883. There is also no reference to the disease in the section on "Hygiene and Public Health," in 1879. The importance of the disease has come to the front as a practical question in mine management only since the adoption of the workmen's compensation act in England of 1906 and the inclusion of nystagmus in the schedule of occupational diseases for which compensation is required to be paid. In a treatise by Cockin[22] it is said under "Nystagmus" that—

"This is a disease which affects the nerves of the eyes; it is more prevalent among those who work by the light of safety lamps than among those who used naked lights. The cause of nystagmus is thought to be either the constant dazzling of the eyes by the bright concentrated light of safety lamps or the strain put upon the muscles of the eyes by work, such as holing. The symptoms of this disease are a twitching of the eyes and impaired sight."

This inadequate reference emphasizes the lack of appreciation of the importance of an affliction that may be much more common in this country than is generally supposed. As there is unquestionably close interrelation between nystagmus and the use of safety lamps, it is regrettable that the extended consideration given to this part of mine equipment in most of the textbooks on coal mining should be practically without useful references to the prevention of a disease which, wherever it occurs, is, without question, a most serious affliction of the men employed, and an important factor of cost in mine management wherever workmen's compensation laws require compensation to be paid for cases of nystagmus directly attributable to the employment.

MEDICAL CONSIDERATIONS.

It has therefore seemed advisable to enlarge upon the medical aspects of a problem that is practically certain, in the near future, to attract attention in the United States, if only along negative lines, to prove beyond a doubt that the affliction is not as common in this country as it is known to be abroad. As pointed out in an editorial in the Journal of the American Medical Association:[47]

"The careful study of occupational diseases is one of the features of the modern conservation movement coming with the recognition of the economic advantage which attaches to the preservation of health in the industrial population. As an instance of the financial aspects of some of these matters we may cite a recent estimate of the cost of the 1,618 cases of miners' nystagmus in the United Kingdom in 1910. The compensation of these individuals is calculated at over $155,000, a figure which does not take into account the poor earning capacity of the men in the incipient stages of the disease and other profits lost by the employers. Aside from its purely humanitarian or scientific aspects, therefore, successful investigation of such an industrial disease promises to pay a rich return. This statement needs to be brought home to American captains of industry who have as yet made only a beginning in a direction almost certain to lead to a profitable outcome from every point of view.

Among miners nystagmus is an occupational neurosis characterized by an involuntary oscillation of the eye bulbs on fixation. It seems to be confined to the workers in coal mines and prevents the miner from accurately fixing anything toward which his vision is directed. Such a disturbance of vision evidently must seriously impair the working capacity of an individual who needs to strike accurately with his pick or to match timbers well in collieries.

There are two prominent views with regard to the etiology of the disease. One of these attributes the nystagmus to the strain of accommodation in the presence of deficient light; the other view associates the disease with the positions taken by the colliers, and assumes that there is a local myopathy affecting the elevator muscles of the eye. The cause and prevention of miners' nystagmus has been investigated lately by Dr. T. L. Llewellyn. It is a striking fact that the disease does not occur in the metalliferous mines where safety lamps are not required. In mines where candles can be used or where electric lamps are in operation nystagmus is not found. Now the safety lamp gives much less light, quickly becomes dirty, throws shadows, and must be placed out of the reach of the picks. We are apt to overlook the amount of our light which is due to the diffuse reflection from the walls of the room in which we happen to be. In the coal mine practically all of the light is absorbed; hence the need of satisfactory sources of illumination.

The disease is shown to attack the men who use their eyes in a much larger proportion than the other men. A large proportion of them suffer from errors of refraction. All have weakness of accommodation. Llewellyn regards nystagmus as a disease of great complexity and one in which many factors are at work. The chief of these is strain caused by deficient light. He believes that, as the result of working for long periods in the comparative darkness of the pit, the cells of the retina probably lose their power of producing sufficient pigment for exact vision. This failure occurs sooner in fair blue-eyed people and in those who are subject to a greater eyestrain, owing to errors of refraction. The more frequent occurrence of nystagmus in winter, the loss of visual acuity, the dread of light, are all points in favor of this theory. Another is the oblique position in which the head is held in many cases, whereby an attempt is presumably made by the patient to bring a fresh part of the retina into action. Darkness itself, Llewellyn suggests, is not enough to set up nystagmus.

Here are the preventive measures proposed: No man with refractive errors should be allowed to work underground and no man should be employed without medical examination. Above all, however, comes the improvement in the lighting power of the miner's lamp. If possible a lamp giving a diffused light should be introduced. Improved ventilation also means a better light. The study of the introduction of electric lamps promises to be of great interest in this connection."

CONTROVERSIAL ASPECTS.

Much to the same effect is an extended editorial discussion on the subject in the *British Medical Journal*[12] of April 13, 1912. The editorial draws attention to the correspondence between Markham, a coal owner, and the Secretary of State for the Home Department, arising out of a letter to Markham from Dr. J. Court, of Stavely, Derbyshire, whose views are based on forty years' experience in coal mining. Court urged that an inquiry should be undertaken into the eyesight of all men and boys working in collieries and other mines in Great Britain, where both naked lights and safety lamps are used, in order to ascertain (1) the cause or causes of miner's nystagmus; (2) the duration and best means of cure; (3) whether there is a constitutional liability; (4) whether one attack predisposes to another; (5) whether mild cases of nystagmus incapacitate a miner for work underground; and if so, to what extent; and (6) whether miner's nystagmus causes the sufferer to be a danger to himself and other miners at work with him. An abstract from the editorial follows:

"There are two views as to the cause of miners' nystagmus. The one attributes it to eyestrain due to working in a badly lighted space with black light-absorbing surfaces; the other to strain of the extrinsic muscles of the eye, especially of the elevator muscles, due to the position of the miner when at work at the coal face, or when examining the roof of the workings to detect gas or threatening falls. The view hitherto most generally accepted is the second, a theory which brings the condition into the same category as writer's cramp and other occupational neuroses. This theory was strongly held by the late Mr. Simeon Snell, who supported it by many cogent arguments drawn from his long experience in treating eye affections among coal miners. He had the support of Nieden, Dransard, and some other continental authorities, but the theory has always been open to the objection that the disorder is seldom met with except among men working in coal mines; those engaged in other mines, it is said, are seldom or never affected in this way. In a paper on the causes and prevention of miner's nystagmus, communicated recently to the Royal Society by Dr. J. S. Haldane, Dr. T. L. Llewellyn, of Bargoed, Glamorganshire, advanced the theory that the nystagmus was due to a condition of imperfect centripetal impulses (imperfect fixation, disturbance of equilibrium, etc.), the intimate connection between the centers governing the associated movements of the eyes being lost and incoordinate movements ensuing. Dr. Haldane has informed the Home Secretary that Dr. Llewellyn's researches in a number of coal fields and also among metalliferous miners confirm Dr. Court's conclusion as to the connection between nystagmus and the very poor light given by ordinary safety lamps. Dr. Llewellyn found errors of refraction (hypermetropia, or astigmatism) present in 93 per cent of 280 cases examined, and concludes that the personal proclivity to the disorder which is undoubtedly an important factor, since only a small percentage of coal miners are affected, may be due to these defects, but he admitted that accident, shock, and ill health are also predisposing factors. He found that the disorder certainly diminished with improved illumination, being almost unknown in naked-light districts, and the principal preventive measures he indicated were improvement of illumination (which Dr. Court also advocates, suggesting the use of electric lamps), employment of coal cutting machines in thin seams, and the elimination of unfit workers by medical examination."

NYSTAGMUS A MINE SAFETY PROBLEM.

The practical importance of these observations is obvious. The evidence upon several important controversial points, however, could hardly be considered sufficient. Snell,[78] in his address as president of the British Medical Association in 1908, described experiments made with the assistance of Dr. A. Stokes, a Government inspector of mines, "which seem to establish the very important practical point that an underground coal worker suffering from miner's nystagmus was not able to recognize the 'cap' which forms on a safety lamp in the presence of fire damp." As, under given conditions, it is desirable to recognize a quantity of gas smaller even than 2 per cent, the implication was that miners suffering from nystagmus in dangerous mines requiring the constant use of safety lamps should not properly be intrusted with their respective duties. According to the editorial in the *British Medical Journal*:[12]

"The disability to see the 'cap' is due to the fact that the oscillations of the eyeballs give the sufferer the impression that the object looked at is in motion; he sees his safety lamp and its flame as if moving, or 'dancing,' as he expresses it. The more rapid the oscillations the more rapid the apparent movement of the lamp, as the oscillations may vary from 100 to anything up to, say, 350 in a minute, the apparent movements of the safety lamp may be very quick indeed, producing little more than the appearance of a blur of light. The oscillations may be to and fro, or rotary, or the two may be combined, but rotary movements are seldom, if ever, absent, and a miner frequently describes the safety lamp as appearing to move rather more in an ellipse than in a circle. The nystagmus is arrested by turning the eyes downward, but in searching for fire damp the examiner must give particular attention to the roof, and consequently must often look up when lying or stooping in a very constrained attitude."

The foregoing discussion was evidently intended to emphasize the necessity for medical examination, particularly with reference to the claims for compensation made on account of nystagmus in recent years in the United Kingdom. According to Llewellyn,[52] 1,618 men suffering from miners' nystagmus received compensation in the United Kingdom in 1911. The subject was therefore shown to be one of fairly considerable importance to the mining industry. Even more important was the final conclusion, that "were it established that nystagmus in the 'deputies' or 'firemen' [equivalent to fire bosses in the United States] whose duty it is to search for fire damp was even an occasional cause of explosions, the arguments in favor of systematic medical inspection would be greatly strengthened."

FACTORS OF CAUSATION OF NYSTAGMUS.

The conclusions of Snell were not new to those familiar with the subject. As far back as 1891, the *Medical Record*[55] of New York contained a statement to the effect that—

"Dr. Snell persists in his opinion that there is no reason for supposing that nystagmus or the nervous disease which manifests itself in a morbid winking of the eye, so common among miners, is attributable to working by the imperfect light of the safety lamp. The fact that the complaint is found among the workers with naked lights is in itself sufficient to throw doubt upon the long-prevalent theory. The Government inspector of mines for the Midland District notes, on Dr. Stoke's authority, the case of a man who, after working with the Davy lamp for 14 years without injury, proceeded to work at a pit where candles were used. He had been employed there for some three and one-half years, and during the last 12 months he experienced symptoms of nystagmus, and had ultimately to leave work and seek medical aid. Dr. Snell has collected a mass of facts and a record of a large number of instances of men suffering from the infection, which will, he believes, be very corroborative of the views he has before set forth, namely, that the prime cause of the affection is to be found in the position assumed by the miner at his work."

OPHTHALMOLOGIC TESTS.

In 1908 the *Engineering and Mining Journal*[38] contained an article on the subject, bearing also on the investigations of Dr. Snell, briefly summarized below:

"A miner with nystagmus when looking at a safety lamp gets the impression that the object looked at is in motion. This is caused by the oscillations of the eyeball, and is due to the weariness of the elevators of the eyes caused by working in constrain positions in the mine.

Forty-eight miners were tested in the ophthalmoscopic dark room in the Sheffield hospital. These men were brought from 13 different collieries and were examined with regard to their capacity to detect the 'caps' of safety lamp flames. All of these men failed to detect a 'cap' until a dangerous amount of gas was present. One could not see a large 'cap' at all. He said his lamp was 'spinning too much'; another could not see a 'cap' until he steadied his eyes. He then saw a 1-inch 'cap.' One who had nystagmus in a marked degree reeled like an intoxicated man when rising from the floor from the kneeling position he had assumed in reading the lamp. The lamp was full of gas before he detected a 'cap.'

The results of the experiments were so astonishing that members of the association now advocate the periodical medical examination of all officials whose duty it is to make the daily gas tests in coal mines. Each inspector should be tested for vision as carefully as locomotive drivers and signalmen. Gas tests with the safety lamp are almost useless unless the tester has good vision. It might be valuable if the question of vision would be investigated by the Accident in Mines Commission, now sitting in Pennsylvania."

The suggestion that the subject should be investigated by the Accident in Mines Commission of the State of Pennsylvania was not carried into effect.

The technical aspects of astigmatism and visual acuity are extremely involved and do not permit of an extended discussion on this occasion. The following extract, however, from an address on miners' nystagmus by Shufflebotham[73] is included as suggestive of the direction in which inquiries of this kind are most likely to be practically useful:

"Visual acuity is nearly always diminished, even in convalescent cases where there is no oscillation of the eyeballs. In severe types of nystagmus where the oscillatory movements of the eyeballs are constant, it is impossible to estimate the field of vision. Out of between 60 and 70 cases of coal miners' nystagmus Cridland found it possible to take the field of vision in 25. Nearly all the patients he investigated were men who had been compelled to give up their work on account of the severity of the symptoms. The results of his examination of these cases showed—

1. That contraction existed for white, blue, and red in practically all the cases examined.

2. The contraction was of concentric type and symmetric in shape, although not always in depth.

3. In the majority of cases the colors were in their correct order, but occasionally interlacing of the red and blue occurred, the correct order being recovered as the case improved.

4. The contractions for red and blue were generally greater than those for white and rather greater for red than blue.

5. By grouping the cases into mild, moderate, and severe types the fields broadly showed corresponding contractions.

6. Speaking generally, as the disease improved the fields of vision improved, but contraction persisted as long as any subjective symptoms were present and although oscillatory movements could not be elicited by any test.

7. Most of the cases showed more or less marked signs of such symptoms as clonic spasm of the eyelid, twitching of the neck, etc., but there seems to be no direct relationship between the presence and the degree of these signs."

AMERICAN INVESTIGATIONS.

The question, however, was taken up by the Illinois Commission on Occupational Diseases, which made up its report[49] under date of January, 1911.

"The following is our report of our investigation of miners' nystagmus in the State of Illinois. Two factors are operating to make this disease less frequent. First, the condition is limited to pick miners, and they are becoming less numerous yearly on account of the increase of machine mining. The following figures, taken from the Illinois Coal Reports for the year ended June 30, 1908, show the percentage of machine mining: Total quantity of coal mined by hand, 34,062,029 tons; total quantity of coal mined by machine, 15,210,425 tons, or over 30 per cent; total number of men employed about the mine in all capacities, 70,841; total number of men employed in actual mining, 46,194; total number of men employed in machine mining, about 16,000; total number of pick men, 30,194. From the foregoing we see that of the total of 70,841 employed only about 30,194 [or 42.6 per cent] belong to the class of workmen subject to miners' nystagmus.

Secondly: The disease is confined to those pick men who work with the eyes in an unnatural position—that is, looking upward and to one side. Previous to the passing of the gross weight law some years ago, the men were paid only for coal which would pass over a screen of a certain size. This caused the men to do a lot of overhead pick work in order to obtain the coal in large pieces. The gross weight law forced the owners to pay for the entire quantity mined, and the miners now assume a more natural position. Of the 30,194 pick men in Illinois, we examined the eyes of about 500, or one-sixtieth of the entire number, without finding a single case. Two men had complained of subjective symptoms of the disease in the past, but at the time of the examination showed no objective symptoms.

Conclusions.—The disease is rare, and, owing to the passage of the gross-weight law and the increase of machine mining, it is becoming less frequent in the State of Illinois. The only cure is cessation of the occupation which caused it."

The conclusions of this investigation were negative, but the investigation was seemingly not made with the required degree of scientific thoroughness.

FREQUENCY OF NYSTAGMUS IN ENGLAND.

A further original investigation was made by Butler,[17] honorary ophthalmic surgeon to the Coventry and Warwickshire Hospital.

Butler points out that—

"In all colliery centers miners' nystagmus is a common disease. It is scheduled under the act of 1906 as a condition for which a miner may claim compensation, and so a knowledge of its leading characteristics is essential to all medical men practicing in such a district. The average ophthalmic textbook devotes only a few lines to the affection, and even the meager information given is apt to be somewhat dogmatic and inaccurate."

Butler further states that the symptoms in a severe case are characteristic, and briefly describes them as follows:

"The eyes oscillate violently, the eyelids twitch, and the man appears to be, and often is, in a state of great nervous agitation. When his visual acuity is tested with the types it will generally be found to be as low as one-tenth of the normal. He is quite unable to read or to continue at his work, and will frequently complain that he can not see his way about in the dark. But such a violent attack is uncommon, and it will be, therefore, proper to consider in detail the more useful manifestations of the affection.

The history is typical. The miner has almost invariably worked some years in the pit, and has in most cases been a "holer," one who lies on his side and undercuts the seam of coal. He first notices that at the end of a day's work the lights begin to 'dance.' They may dance vertically, horizontally, or in a circular fashion like a Catherine wheel. He can for a time overcome this oscillation by looking down and resting his eyes. Soon, however, the dancing commences earlier in the day, and he more frequently has to 'steady' his eyes, and finally the lights begin to dance as soon as he enters the mine, and work becomes impossible. At this period the subjective sense of movement may cause vertigo.

In the early stages of miners' nystagmus the sufferer is free from trouble when he leaves the pit, but as the disease progresses nystagmus is present when it grows dark and the street lamps are lighted. Eventually nystagmus is always noticed, even in daylight.

At the beginning of the case nystagmus commences only when the eyes are considerably raised, then it appears as soon as the gaze rises above the normal plane, and later it ceases only when the subject looks down. In fact, the severity of the attack can be accurately gauged by the angle above or below the primary position at which nystagmus can be elicited. The position of the head, however, has nothing whatever to do with the matter; nystagmus can be demonstrated just as easily in the supine posture if the eyes be directed toward the brows as it can in the erect. Peters is quite incorrect when he states that nystagmus ceases if the head be thrown back. It does so in many cases if the patient looks at the same object, but if he moves his eyes back pari passu with his head nystagmus does not cease.

In a slight case, or one which is in process of cure, it may often be impossible to detect any nystagmus by simply raising the eyes. Reid has taught us that if we rotate the patient several times, until he is a little giddy, and then direct his eyes to the ceiling, nystagmus may appear. If we can produce no nystagmus by this method it is safe to assume either that the case is not one of nystagmus or that it has been cured.

The direction of the nystagmus may be vertical, horizontal, or circular. In my own practice the vertical variety has been rare. One eye may have a different kind of nystagmus from the other.

Hemeralopia may be present. Court found it in 127 cases out of 164; Dransart detected it in 5 per cent of his patients. Romiée states that he has never seen this symptom, although he has examined several thousand individuals. My own experience has been that night blindness is undoubtedly a symptom of the disease. Probably at least 25 per cent of all cases are unable to see in the dusk.

Visual acuity is unaffected when the eyes are at rest. If the types be placed on the floor level and the miner stand upon a chair, he may read the last line; if he sit down and the types be hung on the wall, he may fail to read the top line."

The "holing" mentioned by Butler is somewhat at variance with American mining practice and has been described as follows in an address on miners' nystagmus by Frank Shufflebotham:[73]

"Symptoms of nystagmus are most commonly found among miners engaged in holing, a process which consists of cutting the coal seam so as to get out the coal in pieces as large as possible. The holer lies on his side with his knees drawn up and his head thrown backward, and he strikes the coal with a horizontal swing, the lamp being placed near his feet. He may undercut the seam or 'top cut' it, but in either case the muscles of the eyeballs are continually in a strained position, generally in an upward or oblique direction. As a result of this eyestrain the elevator muscles suffer from strain and cramp. Similar effects are found in other muscles, producing wry neck, twitching eyelids, and tremors of the head. Holers as a class are undoubtedly more predisposed to nystagmus from the nature of their constrained work; hewers and the loaders who are working at the face come next in the liability to the onset of the disease."

TYPICAL CASES.

The symptoms and personal history of the disease have been quoted in full on account of their unusual practical value. Nystagmus unquestionably is often mistaken, at least in its initial stages, for ordinary eye afflictions; for, as observed by Butler,[17] the average ophthalmic textbook devotes only a few lines to the affection, and much of the information is dogmatic and inaccurate. It has therefore seemed proper to add the following description of a typical case, presented by Butler at a meeting of the Coventry division of the British Medical Association in 1910.

"T. R., aged 45, was a miner in the Newdigate colliery, a lamp mine; had been a miner all his life.

About six months ago he began to notice that the lamps were dancing up and down. He had to sit down and 'steady' his eyes. Three months ago, when he was examining the roof, a piece of coal fell upon his nose and cut his face. Had he not had violent nystagmus he would have seen that a large fragment was loose and would have avoided it. After the accident the nystagmus got much worse. He sees very badly at night, not only because everything is in motion, but because there is a 'sort of mist before his eyes.' He sees a little better if he looks down, but not so well as his mates do. In fact, he has slight hemeralopia.

Condition when first seen: Violent nystagmus and switching of lids. Vision=6/60. Advised to give up his work underground entirely and permanently.

Condition a month later: The eyes were normally at rest, but if he looked at an object fixedly for a few seconds his eyelids began to blink and twitch violently and he looked away as though shielding his eyes from a dazzling electric arc. As soon as he looked upward violent twitching and vertical nystagmus commenced.

$$\text{R. V.}=6/60\text{c}\,\frac{-3.5}{-2,\ \text{axis horizontal}}=6/9$$

$$\text{L. V.}=6/60\text{c}\,\frac{-3}{-1,\ \text{axis horizontal}}=6/9$$

The fundus was normal, but could be seen only with great difficulty on account of the twitching of the lids. He was unable to read even when he looked down.

The patient subsequently improved considerably, but he can not do any work, for as soon as he looks fixedly at an object the oscillations commence."

OCCUPATIONAL PREDISPOSITION.

Butler properly observes that this is a most instructive case. In the first place, he points out, it shows the classic symptoms, which have been ameliorated but not cured by rest. Before the compensation act this miner would have been discharged and left to take charge of himself as best he could; under the act of 1906, however, the coal mining corporation was responsible for the disease and had to provide for his needs. In this case also nystagmus conduced to an accident, and the accident aggravated the disease. As regards the etiology of nystagmus, or the causative factors responsible for the occurrence of this affliction, Butler states that—

"The textbooks say that it is strictly comparable to scrivener's palsy, due to cramp of the elevator muscles of the eye. This is the theory enunciated by Snell, by Nieden, and by Dransart; it was for long accepted without criticism or challenge, and has been copied from book to book, rather as a proved fact than a hypothesis. To be brief, the view that the miner is always straining his eyes upward, producing muscle fatigue, which results in nystagmus, does not account for the facts. First, the miner does not strain his eyes upward; like other sensible mortals, he makes himself comfortable and moves his head, not his eyes; secondly, there is no proof that any muscle fatigue exists, and conclusive proof that it does not; and, finally, if muscle fatigue did exist, it would produce a tetanic and not a clonic spasm. Nystagmus is essentially a disease of the collier; it is not found in metal mines, where men work under similar conditions to those obtaining in coal mines, but with one great difference—the metal mine is not bounded by glittering black walls."

SAFETY LAMPS AS A CAUSE OF NYSTAGMUS.

In this connection Butler makes the interesting observation that the disease was first described at the time when the Davy lamp was introduced, and that as soon as the use of safety lamps was enforced by law it became frequent. In his own words, as soon as the illumination of the miner's candle, which gives 0.5 candlepower, was replaced by that of the Davy lamp, with its feeble glimmer of 0.28 candlepower, cases of nystagmus became increasingly frequent. The miner's lamp has been improved now and the disease is much less common than it was. The ordinary lamp used in England in 1910 when clean has a candlepower of 0.44, but as it gets covered with dust and the wick chars its light falls off rapidly.

The method of amelioration is, therefore, suggested by this remark, in that it should not be difficult to insist, if necessary by law, upon the keeping of the safety lamps not only locked but also clean, so as to provide the best possible illumination.

MINE DARKNESS AS A CAUSE.

In concluding his interesting and valuable contribution to the subject of nystagmus, Butler refers to the claim that darkness is primarily a cause of nystagmus. This, he insists, can not be so, as employees in photographic studios, who work for hours in absolute darkness, do not contract nystagmus, nor do boiler makers and other artisans who work by feeble light. He therefore holds that the only theory that can explain the disease is that suggested by Reid, of Nottingham, and Nuel, of Belgium, that it is a disordered cerebration, or, in other words, a defect in the brain and not of the eye muscles. It is produced, according to this view, by the peculiar work of the miner, the long-continued rhythmic movements of the pick in comparative darkness. Finally, the argument is advanced that the attempt on the part of Snell to show that compositors and other workmen occasionally acquire occupational nystagmus will not stand the test of a critical examination, which would lead to the conclusion that these men did not suffer from true miners' nystagmus, but that the disease always was, and still continues to be, the special disease of the colliery.

ERRORS OF REFRACTION AS A CAUSE.

This address led to considerable correspondence, which brought out some additional phases not fully discussed by Butler and some controversial views of considerable practical importance. A letter by Carruthers,[20] assistant medical officer of health of the county of Derby, follows:

"SIR: I notice that, when discussing the etiology of miners' nystagmus (Mar. 5, p. 558), Dr. Harrison Butler did not suggest an error of refraction as a possible predisposing cause, although the case which he describes shows this. I mention this because I know that as a body miners systematically neglect their eyesight, this fact having been forcibly brought home to me during the last few months whilst examining school children in a mining district, the parents simply stating that if their child had to wear glasses he would not be allowed in the pit. I understand that at present no examination of the eyes is required by the owner before a man is employed as a collier; and surely, if evidence could be produced to show that a definite relationship exists between errors of refraction and miners' nystagmus, the owners for their own protection would soon insist on such an examination.

Dr. Harrison Butler states that there is no muscle fatigue (of the eye) when the man is at work; but during such heavy work, when practically all the man's muscles are in use, how can those of the eye escape the general fatigue of the body? If, in addition, a serious error of refraction exists, which of itself would lead to strain, this would be especially noticeable at the end of the day's work, the time when the nystagmus first appears; and I suggest that the nystagmus is akin to the physiologic tremor of the hands which many people have after great physical exertion, but that, of course, it quickly becomes pathologic as the conditions develop.

It may be asked why, if these arguments are correct, miners' nystagmus does not occur as soon as the man becomes a collier? But then his tissues are young, and can overcome the strain imposed upon them, and it is as he gets older and is still subjected to the same conditions of very heavy work in a poor light and in a bad position that the strain is felt and nystagmus shows itself."

Ashforth[4] later contributed a brief statement which is also given in full:

"Sir: The only excuse I can offer for entering on this subject is that I live in a colliery district. Whether the fact that Dr. Harrison Butler did not mention errors of refraction as a cause directly was simply an error of omission, or whether he considered it a contributing cause, but thought it unnecessary to state, I think, matters very little. As in other discussions, one is very apt to believe greatly in himself and his own limited experience, for limited it is.

Dr. Carruthers, so far as I can judge, has simply concluded that miners neglect their eyesight because a few parents have said something about their children and the pit. Now that would lead one to think nystagmus was a modern disease or ailment; but I am certain Dr. Carruthers will agree it is not. As it is, some people avoid glasses because of the compensation act. Again, this act is new (comparatively), and can not account for nystagmus before the act, because miners would have no fear about wearing glasses or having their eyes examined. I agree with Dr. Harrison Butler that there is no muscle fatigue of the eye, and disagree with Dr. Carruthers when he suggests that all the man's muscles are in use. I agree that a serious error of refraction may contribute, but I do not believe it to be the cause; personal experience in colliery districts has not taught me so. It is not safe to compare or draw an analogy between nystagmus and a physiologic tremor of the hands.

As to the tissues being young and able to resist, I may state that all the cases I have seen have been men under 40; some I have seen over 50, but they are not so numerous.

In conclusion, might I suggest that the cause might as easily be found in the retina as anywhere else?"

In reply to these two letters, Butler[18] made answer as follows:

"SIR: I unfortunately did not notice Dr. Carruthers' letter in the *Journal* of March 12 at the time. It would appear likely that an error of refraction would be a predisposing cause, whether one regarded the disease as a fatigue cramp or as a loss of coordination due to partial loss of fixation. But supposition and theory must bow to fact, and the fact is that errors of refraction are found among nystagmic miners in exactly the same proportion as among the rest of the population. Some of the worst cases I have seen have been emmetropic, and have shown no error of muscle balance, so we can only conclude that errors of refraction have nothing to do with the matter. This is not the place to discuss with Dr. Carruthers the etiology of the disease. He will find the whole question argued out in my paper on the subject in *The Ophthalmoscope,* to which I alluded in my article published on March 5. At the end of this paper there is a full bibliography dealing with the subject. I would recommend him to read Dr. Reid's paper in *Brain,* and then to examine a long series of cases for evidence of muscle strain. The case published in the *Journal* of April 16 is almost positive proof that cramp of the elevators has nothing to do with the production of the disease. In this highly interesting case nystagmus appeared only when the miner looked down."

These letters bring out the imperfect status of the whole question as regards the essential points of material importance, not only to the physician and the miner, but also to the mine manager and the courts called upon to pass judgment in the arbitration of cases of workmen's compensation.

FATIGUE OF VISION AS A CAUSE.

The *British Medical Journal* also reports an animated discussion regarding nystagmus, between Romiée and Thiebert, both of Liége, and Moret, of Charleroi, Belgium.[45] The two former concluded that miners' nystagmus was due to insufficient lighting, was benign in nature, and rarely interfered with ability to work. They strongly objected to the theory that nystagmus involved an increased liability to accident. Moret discussed the causation, concluding that the infection was a neurosis produced by ocular fatigue due to darkness, combined with fatigue of the muscles, notably the elevators, from the strain of looking in an abnormal direction. A number of French representatives insisted on the risk of accident from this condition, and Shufflebotham[73] pointed out that nothing had been said respecting the subjective and objective symptoms that occurred apart from the ocular symptoms.

The foregoing discussion aroused considerable interest and resulted in several important papers by qualified authorities familiar with the actual facts of the existing situation in the United Kingdom. Elworthy,[36] inspector of injured workmen to the Ebbw Vale Co., read a paper on miners' nystagmus before the Monmouthshire Division of the British Medical Association. After first pointing out that miners' nystagmus is a disease peculiar to coal miners, and that on the basis of personal inquiries, no cases had been found to occur in the Cornish tin mines nor in the lead mines of the Isle of Man, Elworthy replies to the question as to why it is that nystagmus occurs only in coal mines, to the effect that it is the entire absence of color that makes all the difference in the underlying conditions responsible for its frequency among colliers. He remarks that—

"I take it that the cause is fatigue of the eye, resulting from working by artificial light with a black background and nearly black surroundings. There is the blackish 'rubbish' or 'slack' above and below the coal, and the jet black coal with some sparkling facets which reflect the light. The monotony is not relieved by other colors. The miner may come to work with clean face and clothes, but in a few hours all is more or less black from the dust. Then he has to fix with his eye the point at which to strike with his mandril or to lift out lumps of coal against a black background. When he turns his eyes away from the coal there is no color relief. To make matters worse, the majority of miners prefer to work in the day. The consequence is that for the greater part of the year it is dark when they get up and go to work; they work in the dark, and in winter it is dark soon after they come out. They therefore get the minimum of daylight, and the opportunity of seeing a variety of colors by daylight, which means physiologic relief to the eye."

This is rather a novel point, not emphasized by the earlier authorities; but as another cause of fatigue to the eyes, he points out that when the miners have to walk a mile or more underground to reach the face where they work, "they proceed more or less in single file, each carrying a lamp which gives out light in every direction," with the result that "the miner walking behind another gets the glare of that lamp in his eyes all the time. * * * Then, after working his eight hours and his eyes being more or less exhausted, he has to make a similar journey back." On inquiry, Elworthy found that the men feel the effects of nystagmus most when returning from work with the intense glare of the lamp just in front of them, and many find it necessary to sit down and wait until the effect disappears.

OBLIQUE NYSTAGMUS.

As regards the theory that nystagmus was produced by working in a lying-down position, Elworthy was not in a position to give an opinion, as in the great majority of the mines of the Ebbw Vale district the colliers work in an upright position. He therefore had not seen a single case of oblique nystagmus. He, however, points out that other underground workers, such as haulers, timbermen, and repairers in coal mines also acquire nystagmus, and that the only class that seems immune is hostlers, which he attributes to the fact that the underground stables, as a rule, are whitewashed. He therefore concludes that the only essential factor seems to be exhaustion of the eyes from working in the general blackness without any color relief.

The discussion by Elworthy included the pathology, symptoms, and course of the disease, the varieties, diagnosis, prognosis, and the treatment of nystagmus in the light of practical experience, including the results of an analysis of 100 cases. All that he has to say is of unusual practical interest, except that with referenec to pathology he limits himself to the statement that he is ignorant about the minute changes in the retina, or nerve centers of the orbital muscles. He says:

"What seems to me to occur is, when a certain stage of exhaustion is arrived at, coordination is lost and spasm sets in; very much the same as in writer's cramp or other trade neuroses. Lastly, accommodation fails. The spasms are clonic, and may be regular or irregular, and confined to two opposing muscles or affecting more. In some cases the whole head is in a state of tremor. In the early or 'latent' stage, although there are movements of the eyes, there is sufficient power of accommodation to prevent confusion of vision, but sooner or later this accommodation fails."

SYMPTOMS AND COURSE OF THE DISEASE.

As regards the symptoms and course of the disease, Elworthy states that:

"Nystagmus seldom manifests itself until the miner has been working for some years. In the case of boys getting it there may be some refractive error or hereditary element. One boy I examined, aged 15, who got nystagmus after working three years, was the son of a collier who admitted having had trouble with his eyes, but had not been on compensation for it.

The first stage of the disease may be called latent nystagmus. The patient may be perfectly unconscious that he has anything wrong with the eyes, although nystagmic movements may be quite obvious and definite. One case I examined for an injured back, and who then had nystagmus, worked ten months before being certified for it; another who also injured his back over two years ago has not yet been certified; so that as long as the disease remains in the latent stage, unperceived by the patient, it does not seem to interfere with his work. I do not know how long this may continue, or whether the movements are continual or only periodic.

There is in many cases a general and increasing nervous irritability, and then a blow or sudden fright is sufficient to break down the coordination of the ocular muscles, and the power of accommodation to see with moving eyes is lost. The man then discovers that he has nystagmus.

When the disease comes on naturally the first symptoms may be various. In some it is the lamps that seem to move or become blurred, or he becomes dazzled by them; in others headache or pain in the eyes, or else everything becomes misty and he is lost in a fog.

When movements are well developed everything seems moving about, and he becomes giddy and staggers. Bending down or sudden movements increase the trouble; so does fright. A man may be able to walk about the street well enough, but if a dog barks or if some one shouts at him he is immediately lost in a fog and staggers about quite unable to see what is coming or where he is going. Hence the danger of such men working in mines.

The most constant symptoms are headache, giddiness, and movements. My records are far from complete, and I find only 43 per cent with these three symptoms noted; but my impression is that fully 60 to 70 per cent have them all. Giddiness and movements, but without headache, also occur, and I find 7 cases with the definite record of no headache and 6 in which headache is not mentioned. Of these 13 cases, 8 were rotatory, 4 lateral, and 1 mixed.

Intolerance of light and continual headache are frequent, and in severe cases the man can sit about only with his eyes shaded and his back to the light. In such cases there may be an error of refraction as well.

One variety often passes into another, a rotatory to a lateral, or vertical to a rotatory with nictitation. Nictitation often comes on late, and may be the last objective symptom visible, but in some cases it is present early, with very indefinite movements of the eye.

The two eyes may be equally affected, or have different movements, one lateral, the other vertical or rotatory, but I have never seen two eyes rotating in opposite directions. The greatest discomfort and pain in the head is caused by the very fine and quick movements, and the least by the slower rotatory. An error of refraction may cause persistent headache, and delay recovery unless corrected by proper glasses, which, however, can not be worn in the pit."

In this connection the following observations by Shufflebotham[73] regarding the symptomatology of miners' nystagmus are of interest:

"In miners' nystagmus we are dealing not with a disease localized to the eyes, but with a general disease one symptom of which is oscillation of the eyeballs. I believe that the term 'miners' nystagmus' is unfortunate, as it simply relates to one symptom of this complaint, and the symptoms are not confined to oscillation of the eyeballs and effects resulting from this phenomenon. There may be, and generally are, symptoms such as headache, nausea, attacks of giddiness, muscular tremors, twitching of the muscles in different parts of the body, especially the muscles of the eyelids and the face and the neck; neurasthenia may be a prominent symptom, with its associated conditions such as a quickened pulse, exaggerated reflexes, increased vasomotor irritability, sleeplessness, and nervous depression. All these symptoms may be present in any case of miners' nystagmus, but in many cases only some of them are present, and at given times the prominent symptom—the oscillation of the eyeballs—may actually be absent, although the patient is undoubtedly suffering from this disease."

VARIETIES OF NYSTAGMUS.

These observations and conclusions in a general way are confirmed by other authorities, but in the work cited they are set forth with unusual clearness and therefore are quoted in full. It also seems advisable to cite in complete detail the seven varieties of nystagmus as observed and defined by Elworthy[36] as follows:

"1. Lateral.—An alternating clonic spasm of the internal and external recti.

2. Vertical.—An alternating clonic spasm of the superior and inferior recti.

3. Rotatory.—An alternating lateral and vertical nystagmus in regular sequence producing rotation. In one case with a

large and flaccid eye it was quite easy to see the tug of the several rectus muscles at their insertions into the globe.

4. Mixed.—An alternating lateral and vertical nystagmus in irregular sequence, producing rotation but irregular movements.

5. Oblique.—Presumably a synchronous contraction of a superior with one of the lateral recti alternating with the inferior and the opposite rectus. It could also be produced by the two oblique muscles if the deviation of the axis is not corrected by the recti.

6. Axial rotation.—Alternating spasm of the superior and inferior obliques, with no deviation of axis. I have one case, which seems the most remarkable of the series. Coordination of the recti had not broken down, otherwise there would have been oblique nystagmus. But the only movement visible was rotation on the anteroposterior axis.

7. Nictitation.—Clonic spasm of the orbicularis muscle. Generally associated with some other movement, but sometimes present alone. As it occurs with considerable frequency, I think it should be classed as a variety of nystagmus."

With reference to diagnosis, he points out that this is easy enough in the majority of cases. As emphasizing, however, some of the practical difficulties of exact diagnosis, the following case is quoted in view of its bearing upon problems of workmen's compensation:

"I had one case of the indefinite class, who received compensation for a considerable time, and who was admitted to a hospital for some intracranial disease from which he eventually died. No nystagmus was observed while he was in hospital, but he had optic neuritis. This man was certified on subjective symptoms only. It is all very well to certify cases on subjective symptoms just because a man happens to be a collier, but it is very difficult to disprove a claim for compensation if there are these indefinite symptoms, which may, after all, have nothing to do with miners' nystagmus."

ANALYSIS OF CASES.

The results of an analysis of 100 cases are briefly summarized in the statement that the average age at the commencement of the disease was 35½ years; the average number of years a man had been working underground was 21¼ years; and the average period between the first indications of nystagmus and the ultimate and subsequent leaving of work was 8 months. This average, however, included three cases with an exceptionally long duration of 2 to 8 years, and if these are excluded the average period was 6½ months. The average subsequent period of disability for all cases was 5 months, but as this included latent and uncertified cases, the average is rather an underestimate. A number of men resumed work on the surface before complete recovery. The longest period of disability was 28 months, without recovery. The shortest was 3 weeks. There were 18 latent cases, and of these, 8 first noticed nystagmus after a blow on the head; 1, after a blow on the head but without becoming aware of nystagmus until 16 months later; 5, after blows on the eye or eyebrow; 2, after blows on the back; 1, after a blow on the leg; and 1, after a sprain of his side. As regards the varieties met with, the cases were classified as follows:

"Of 14 cases in which nictitation was a prominent symptom, those with some other movement, such as vertical or lateral, are included in those classes, and those with no definite movement except nictitation in the indefinite. There were: Rotatory, 27 cases; lateral, 25; indefinite, 18; vertical, 12; mixed, 12; not recorded, 5; axial rotation, 1; oblique, 0; total, 100."

ADEQUATE TREATMENT AND PERMANENT CURE.

Coming to the important question of prognosis, Elworthy remarks that although his experience had been rather limited he found that the men who remained at work for months struggling against the disease, until finally obliged by necessity to give up their employment, required the longest time to recover, especially if advanced in years. Given a young man who has been underground for, say, 10 to 15 years, and who applies early for treatment, say, within 2 or 3 weeks after the first indications, the prognosis is distinctly favorable, but even then 2 to 4 months will be required in summer, and a longer period in winter. According to the experience had, it was found that the sooner a man with nystagmus leaves off work the better is the prognosis, but in the early stages the diagnosis is more difficult, as there may be no definite objective symptom visible.

DURATION OF DISEASE.

As regards the relation of the duration of the disease to the variety of nystagmus, it is stated that one case of axial rotation recovered in 6 weeks; 18 indefinite cases recovered in an average of 3 months; 27 rotatory cases recovered in 4½ months; 14 cases associated with nictitation, in 5 months; 25 lateral cases, in 5½ months; 11 vertical cases, in 6 months; and 12 mixed cases in 8 months. The observations had not extended over a sufficient length of time to prove whether any cases were incurable. It was also ascertained that twice as many cases recovered in the 6 months from April to September as did during the months from October to March. This variation is attributed to the fact that in summer there is more daylight, and more color about the country.

On the question of relapses, it is said that—[36]

"One would expect that as coal mining produces the disease, so resuming work underground would produce relapses. How many of these cases will relapse, or how long it will take, I do not know. I have not had time to see yet. For the 7 cases of relapse included in the 100 the average time from resuming work to the relapse was 12 months. Two more have been observed with recurrence, but have not ceased work. One of these is now 2 years after resuming. The variety of nystagmus in a relapse is not always the same as in the first attack.

SUBJECTIVE TREATMENT.

The importance of subjective treatment is first considered under preventive measures; and, second, from the strictly medical aspect. On the assumption that the direct cause of nystagmus is a complete absence of color in coal mines, the argument is advanced that—[36]

"The importance of daylight seems to have been overlooked both by the miner and the employer. I take the view that, as far as nystagmus is concerned, working underground in daytime is a mistake, as the miner in doing so loses his opportunity of refreshing the eye by looking at colors in daylight, and so, in a measure, compensating himself for working by artificial light without color relief.

To get this relief, the hours of work might be altered somewhat as follows:

Start work at the pit head	4 a. m.
Come out	12 midday
Allow an hour to get home at	1 p. m.
Recreation and see the world till	6:30
Bed	6:30 to 2:30 a. m.
Breakfast and get to pit head by	4 a. m.

He would thus get some four or five hours of daylight all the year round, which is of far more value to the eye than artificial light."

METHODS OF IMPROVING ILLUMINATION.

It is further suggested that to prevent unnecessary fatigue to the eyes removable shades should be provided for the lamps, so that the light will be given out in the front only. Such lamps should be used in going in and out of the mines. When at the face, it is suggested the shades could be taken off, so that the light would not be interfered with. Finally, the suggestion is made that some sort of color scheme should be introduced into coal mines so as to bring about conditions as good at least as in lead mines. In brief, according to Elworthy,[36] as the essential cause of nystagmus is absence of color, the one rational preventive measure is the substitution by artifice of sufficient color to compensate for the deficiency. It is therefore proposed that the roof, the leeward sides of the posts and collars, and the cogs and sides of the alleyways be colored with some light but inexpensive wash, whitewash, or, preferably, green or other varied colors. It is realized that this would have to be done daily on account of the dust in the mine, and although this would be expensive, it is pointed out that compensation for nystagmus cases is itself a serious element of management expenses. The argument is advanced that—

"If a quarter of the sum lost through nystagmus were spent in continually coloring the mine, and was enough to bring its color relief up to the level of a lead mine, I do not see why nystagmus should not be abolished, and the other three-quarters of the loss wiped out."

MEDICAL AND MECHANICAL TREATMENT.

The recommendations regarding medical treatment are briefly set forth as follows:

"The first thing to do is to remove the cause, that is, stop work underground. Let the patient rest, and in subdued light if he has photophobia.

We have to deal with a state of exhaustion and increased nervous irritability. Therefore, at first medical treatment should be sedative—such as the bromids or hyoscyamus.

Later these should be replaced by stimulant tonics and brighter light as he can tolerate it. To commence with stimulants seems to me like whipping up a tired horse instead of resting it.

Mechanical.—Eye shades, blue or smoked goggles, give a good deal of relief in some cases, especially in sunlight and snow, but fail in others. I should like to see other colored goggles tried, particularly green. One man recently told me that when his eyes are very painful he gets relief only on going into a green wood or field.

Proper glasses should be prescribed to correct errors of refraction.

Electrical.—I have not seen any cases that I am aware of being treated by electricity. In chronic intractable cases there seems a fair field for experiment with various forms of electrical treatment.

Special departments in hospitals.—Whether it would be profitable to provide green or other colored rooms and take in cases as patients and apply other special forms of treatment is uncertain. Very likely some way of cutting the disease short could be discovered, but, personally, I think better value for the money would be gained by the preventive measures I have indicated."

NYSTAGMUS AS AN ECONOMIC PROBLEM.

This extended account of nystagmus as a practical question of mine management seems to leave little room for further discussion. The importance of any occupational disease, however, is not to be measured by its numerical frequency but by its economic effect on the working capacity of the employee. In proportion as the disease incapacitates for work, the essential and economic consequences to the workmen and to the

State are a matter of most serious concern. As under modern workmen's compensation the period of incapacity involves a considerable money payment to the employee, the question is also one of serious importance to mine managers. It is largely because of workmen's compensation law that the disease has attracted so much attention in the United Kingdom within recent years. Even in so complete a treatise as the Elements of Mining and Quarrying, by Foster,[41] nystagmus is disposed of in less than eight lines. As yet most of the medical observations must be considered preliminary to a thorough, strictly scientific study of the subject. Every new contribution by a qualified medical authority adds materially to the existing knowledge of a question that is bound to assume importance in the future, not only as regards its economic aspects but even more so from the humanitarian point of view. Observations and conclusions based on actual cases are, of course, of greater practical value than conclusions resting chiefly on theoretical considerations. Browne and Mackenzie[15] have published a review of 100 cases of miners' nystagmus, with observations on the etiology and treatment of the disease. The conclusions of these authors are briefly referred to in a reference to nystagmus in the treatise on occupational diseases by Thompson.[84] The conclusions formed by Browne and Mackenzie,[15] on the basis of 100 consecutive cases treated by them jointly, are summarized in the statement that the factors contributing to the production of nystagmus are: First, inadequate light; second, errors of refraction; third, straining of ocular muscles; and, fourth, neurotic temperament. The conclusions, in detail, are as follows:

"1. Inadequate light.—That this is an important cause of miners' nystagmus is conclusively proved by the fact that 99 per cent of our cases had been using the lock lamp for a number of years. Only one case was found where the naked light was allowed, and here the nystagmus was accounted for by hypermetropia, much straining of the ocular muscles in narrow seams, and a markedly neurotic temperament with much physical debility.

The lock lamp must be 9 feet from the farthest point of the mandril, and so the workman is staring into comparative darkness, whereas the naked light is attached to the workman's cap or to a post close beside. Therefore, the naked light gives a much brighter and stronger light not only because it is exposed but also because the workman has its full benefit. We have also had experience with miners in various parts of Scotland, where the naked light is used, and in these districts miners' nystagmus is practically unknown.

2. Errors of refraction.—An examination of the summary of cases of miners' nystagmus seen by us will show that 90 per cent had errors of refraction, excluding the three cases in which there was evidence of error, but owing to marked photophobia no exact estimate could be made, while 7 per cent had normal refraction. Of the 90 per cent, 48 per cent had either myopic, hypermetropic, or mixed astigmatism; 27 per cent had simple hypermetropia; and 15 per cent had simple myopia. It is interesting to note that a large number of the cases of hyermetropia were those of comparatively young men who had worked only a few years at coal cutting.

3. Straining of the extrinsic muscles of the eyeball.—This is the result of the two foregoing factors. In all our cases the workman had his eyes fixed in a staring, strained position for long periods, either downward and laterally, as in narrow seams, or upward, as in wide seams; 90 per cent of our cases were engaged in cutting coal, while 10 per cent were haulers and timbermen, and one a colliery examiner.

4. Neurotic temperament.—The inability on the part of a very large number of men with nystagmus to concentrate their physical or mental powers in any particular line of action guides us to the conclusion that such instability is probably much more the cause than the effect of nystagmus. It most certainly appears to be a weak point in the miner's armor and would repay careful examination long before the stage of inability to work.

The severe headaches and aching eyes of which these men complain are accounted for by errors of refraction and straining of the eyes; the vertigo, by incoordination of the ocular muscles; the conjunctivitis and photophobia by the sudden frequent change from darkness into dazzling light."

AVERAGE AGE OF PATIENTS AND DURATION OF INCAPACITY.

An extremely interesting and useful table that is appended to the paper gives in detail the age, occupation, years underground, degree of refraction, oscillation, and the necessary explanations for 100 consecutive cases. Most of the men were miners and the exceptions are so few that it may safely be assumed that nystagmus is exceedingly rare among other underground employees. The average age was 34.95 years, the range in years being from a minimum of 18 to a maximum of 67. The average period of underground work was 19.1 years, the range in working time being from a minimum of 2 years to a maximum of 40 years. The oscillations were very slight in 2 per cent of the cases, slight in 26 per cent, marked in 48 per cent, very marked in 2 per cent, and rotatory or marked rotatory in 16 per cent.

Other important results disclosed by the table can not be conveniently summarized in a statistical form.

METHODS OF PREVENTION.

The authors sum up their conclusions regarding prevention in the statement that this resolves itself into medical examination of all men engaged to work underground, and the periodical examination of all underground workers for (*a*) the presence of refraction errors, (*b*) any signs of incipient nystagmus, and (*c*) physical or nervous debility. The authors emphasize the importance of adequate light, and they were surprised to find that even in the most up-to-date collieries there was, as yet, no indication of electric light being used throughout the workings. They were of the opinion that if such precautions were taken, and electric light installed in all working places in collieries, or if electric lamps capable of giving light for at least eight hours were supplied to all underground workers, miners' nystagmus would soon be unknown, and serious accidents to workmen, and consequent loss to the employer, would much more rarely occur. They overlooked the fact that electric light can not be used in gaseous mines for the essential purpose of determining the presence of fire damp.

METHODS OF TREATMENT.

The only curative treatment prescribed is rest, the use of strychnin, and the correction of refraction errors. However, the correction of refraction errors would require suitable glasses, which, of course, could not be worn underground. The conclusions are summed up briefly as follows:

"1. There are certain important contributory factors in the production of miners' nystagmus, such as inadequate light, refractive errors, and muscular strain.

2. Nystagmus is a menace to the miner working underground, as it may prevent the early detection of flaws in the roof, and falls may result. An illustration of the gravity of this danger is the fact that one of our cases was a colliery examiner.

3. We are convinced that the preventive and remedial measures suggested would, if carried out thoroughly, soon make miners' nystagmus a very rare complaint and greatly facilitate the detection of the small blue cap which indicates the presence of fire damp."

A PROBLEM IN WORKMEN'S COMPENSATION.

A more recent scientific study of miners' nystagmus is the lecture by Llewellyn,[52] Tyndall research student of the Royal Society, delivered at the Mining Machinery Exhibition, London, on May 31, 1913. In this address certain aspects of the disease are treated from new standpoints, and throughout the fact is kept in mind that nystagmus, because of the workmen's compensation law, is of considerable economic interest to mine owners and insurance companies. After restating the conclusions now rather generally accepted, that miners' nystagmus is an occupational disease of the nervous system and is found only among workers in coal mines, the author refers to the first case described, in Belgium in 1861, by De Conde, and then mentions the work of C. Bell Taylor, Nieden, von Graefe, and Snell. Romiée is mentioned as having pointed out that the earliest recorded case was described in Belgium 10 years after the safety lamp had been recommended for use in that country, and that it was only after the compulsory introduction of the Mueseler lamp in 1876 that an increase in the number of cases of the disease was noted. Llewellyn summarizes the two principal views as regards the causation of the disease in the statement that (1) nystagmus is due to the position assumed by the miner at his work, and (2) that it is due to deficient illumination. The first view was ably and strongly advocated by Dransart, Nieden, and Snell, and the controversy of Snell with Court was referred to in the statement that Court was the first English observer to call attention to the importance of the light factor. The importance of the light factor is now accepted by practically all English observers, but on the Continent a diversity of opinion continues to prevail.

RELATIVE FREQUENCY OF SYMPTOMS.

The lecture of Llewellyn is of unusual value, in that it includes an analysis of 600 cases. The discussion regarding the frequency of the various symptoms, and the statistical data concerning 600 cases, follow:

"Symptoms.—The first symptom is failure of sight, especially at nighttime, or when the sufferer is called upon to perform the more skilled portion of his work. The man next complains that the lamps dazzle his eyes, and sooner or later that the lamps and all surrounding objects dance before him. Headache, varying from slight pain between the temples to attacks of extreme severity, giddiness on exertion and stooping, inability to see at nighttime, and dread of a bright light are often present.

There are two distinct varieties of the disease. In the first the symptoms are absent or latent, and the man, suffering no disability, is unaware that he has nystagmus; in the second the disease is manifest and the man is more or less incapacitated, and aware that his eyes are affected. Among 750 consecutive cases, 150 latent cases were observed.

The table shows the frequency of the various symptoms in the remaining 600 manifest cases."

Symptoms in six hundred manifest cases.

Symptom	Number of cases	Percentage of 600 cases	Symptom marked	Symptom very marked
Movements of objects	566	94.3	....	....
Headache	507	84.5	51	16
Giddiness	490	81.6	52	8
Night blindness	459	76.5	4	....
Dread of light	284	47.3	10	....

The physical signs are briefly stated to be involuntary and irregular movements of the eyeballs, chiefly of a rotatory character, tremor of the eyelids, eyebrows, head, and, in some cases, even of the neck and shoulders. There is also often a backward inclination of the head with drooping eyelids. Reference is made to a recent attempt to describe a condition in which miners' nystagmus could exist without the presence of nystagmus proper, or, in other words, where the oscillation of the eyeballs would be replaced by a blinking of the eyelids; this question has not been settled, but it was at the time under consideration by a departmental committee. The numerical frequency of the disease, which, according to foreign authors, runs from 5 to 20 per cent of all workmen underground, is shown in a table of the certified cases according to the workmen's compensation act for the years 1908-1911, as follows:

Frequency of disablement.

Year	Number of certified cases	Proportion of cases to underground workers
		Per cent
1908	460	0.06
1909	1,011	.23
1910	1,618	.19
1911	2,519	.29

INCAPACITY FOR WORK CAUSED BY NYSTAGMUS.

The results of Llewellyn's inquiry regarding incapacity for work resulting from nystagmus are summarized in the following statement:

"Slight cases can soon return to work underground; ordinary cases can return after an interval of surface work of 3 to 12 months. Although one attack of nystagmus predisposes to another, I think it only fair to allow a man to try to regain his income by working underground again if possible. The exceptional cases should not return to work underground, and by exceptional cases I mean the following: Men who have failed to work several times before, very young lads, old men with commencing cataract, men with high degree of refractive error, and those cases which have been of exceptional severity. The following table was taken from returns, extending over four years, from five large colliery companies employing over 28,000 men:

Back at old work	152, or 45 per cent
Left employ or commuted	9
At surface work	105
Idle	73"

MINE DANGERS RESULTING FROM NYSTAGMUS.

In reply to the important question as to whether it is dangerous to employ a man on the ground that he has once suffered from nystagmus, Llewellyn comments as follows:

"In the first place, is the man more liable to accident? It is very difficult to answer this question. Men are often sent out of the pits by managers from fear of this danger, but this is when they are about to fail on account of the disease. I think it probable that many slight accidents are due to nystagmus, but I have only once had a complaint from a man that his accident was directly due to his nystagmus. There is, however, the possibility of a greater danger, namely, that a catastrophe may result from the failure of a fireman or collier suffering from the disease to detect the presence of gas. The table given below shows the results of tests made on all the firemen of five large collieries. The tests were made on the surface with the help of an Oldham gas-testing chamber. The men were first examined for the presence of nystagmus, and then tested independently for their ability to detect the cap given in the presence of gas."

The evidence to substantiate the foregoing conclusions is set forth in the table below:

Results of examination of miners for ability to see gas cap.

Condition of miner	Number of men tested	Number giving correct estimate	Quantity of gas shown by cap.					
			Trace	1 per cent		2 per cent		3 per cent
			Falied	Failed	Underestimated	Failed	Underestimated	
Normal	49	28	14	4	9	......	14	Seen by all, but frequently underestimated.
Nystagmic	41	4	19	10	13	6	12	

The table shows that all the men examined were able to detect the presence of gas when 3 per cent was in the chamber; but the nystagmic cases are shown to have been responsible for more mistakes than were made by men not afflicted with the disease.

DETAILS OF ENGLISH EXPERIENCE.

The statistical results of the analysis are, in brief, that the mean age was 39.84 years and the mean number of years of underground life was 25.58 years. These averages should be compared with the analysis of 100 cases by Browne and Mackenzie and of another 100 cases by Elworthy. The occupations of 685 cases were given, but underofficials were excluded. It was brought out that although all classes of workmen were affected, the great majority of the men were employed at the face of the mine. Out of 685 cases of all underground employees 557, or 81.3 per cent, were either miners or mine laborers employed as fillers or loaders. The number of timbermen and repairers suffering from nystagmus was 52, or 7.5 per cent, and the number of haulers or trackmen was 40, or 5.8 per cent. Other occupations represented were: Rippers, 8; laborers, 6; contractors, 5; underofficials, 3; and hitchers, engine drivers, hostlers, and masons, 1 each. This analysis does not show clearly what is meant by the previous statement, as given in the lecture, that underofficials were not considered.

As regards the method of getting coal and its relation to nystagmus, it is pointed out that although many authors hold undercutting with a pick to be the chief factor in the production of the disease, the following analysis is based on answers given by 580 nystagmus cases who either were or had been miners. Much holing, or undercutting, accounted for 177 cases and some holing for 171, or a combined total of 348 cases, or 60 per cent. In 40 cases the men had done little holing and in 192 cases no holing, or a combined total of 232 cases, or 40 per cent. In further explanation of this point it is stated[52] that:

"Colliers in Somerset, Forest of Dean, and in the house coal pits of South Wales all get their coal by bottom-holing, yet nystagmus is very rare in these pits. The collier when holing is supposed to direct his eyes obliquely upward, and the advocates of the old school say that nystagmus results from the strain produced by this unnatural position of the eyes; but does a collier look obliquely upward when he holes? A collier looks upward when engaged in top-holing, but not when he holes in the bottom. The eyes are then either directed straight forward or a little downward. A little consideration will show that the swing of the pick will be more powerful and complete when the blow is ended below the level of the eyes."

RELATION OF NYSTAGMUS TO THICKNESS OF SEAMS WORKED.

The bearing of the thickness of the seams in which miners work on the relative frequency of nystagmus was inquired into, but the results of the investigation were seemingly negative. The results are summarized in the table below:

Relation of thickness of seams to frequency of nystagmus.

Thickness of seam	Number of cases of nystagmus
Less than 2 feet	1
2 to 3 feet	47
3 to 4 feet	133
4 to 5 feet	148
5 to 6 feet	115
6 feet and over	141

On the important question of illumination it is stated that:

"In metalliferous mines candles or open lamps are used, while in a coal mine safety lamps are often necessary. The naked light coal mine comes midway between the safety lamp coal pit and the metalliferous mine, having the general blackness of the former and the good light of the latter. Manifest nystagmus is common in the safety lamp coal pit, rare in the open light coal pit, and unknown in the metalliferous mine. Nystagmus is practically unknown in the purely naked light districts of Somerset and the Forest of Dean and is rare in the open light pits of South Wales. In South Wales most of the men have worked at one time or another with lamps, and it is common for the men to continue working in an open light pit after they have failed to work with lamps. Taking into consideration the number of men employed, England and Wales, using safety lamps three times more frequently than Scotland, had four times the number of cases of nystagmus in 1910."

SAFETY LAMPS AND INADEQUATE ILLUMINATION.

Of the number examined, 741 men had used safety lamps, and 723 of these had used such lamps almost exclusively. Only 9 of the men suffering from nystagmus had worked with candles alone. As the result of a special investigation in South Wales, the data summarized in the tables below were obtained. The facts are of special interest in that the number of men working in both classes of mines was known and the illumination at the coal face had been tested.

Number of cases of nystagmus and average mine illumination.

Working place	Relative proportion of certified cases of nystagmus to men employed	Average illumination at coal face
	Per cent	*Foot candles*
Safety-lamp pit	6.3	0.008, or 1
Candle pit	1	.09, or 5

The conclusion is therefore advanced that in the same district the incidence of nystagmus was found to vary inversely with the candlepower of the lamps used. This important and far-reaching conclusion is sustained by the next table, which gives the number of cases of nystagmus, together with the number of men employed and the candlepower of the lamps:

Comparison of number of nystagmus cases and candlepower of lamps used.

Pit	Number of men employed	Number of cases of nystagmus	Rate per 1,000 employed	Candle-power of lamps
A	450	9	20.0	0.235
B	1,400	22	15.7	.27
C	1,500	10	6.7	.33
D	2,500	14	5.6	.4
E	1,900	8	4.2	.42

I have included in this table a new column, showing the nystagmus rate per 1,000, to facilitate a more precise comparison of the different groups.

The relative efficiency of different types of lamps and their relation to nystagmus is discussed at some length in Weyl's treatise on industrial diseases,[86] which includes a reference to the Pollak lamp, with illuminating power of 0.9 of normal candlepower. Weyl is of the opinion that the only hope for relief lies in the direction of a material improvement in the illuminating efficiency of the existing types of safety lamps.

DIFFERENTIAL FACTORS OF ILLUMINATION.

Llewellyn[52] continues his interesting discussion by a careful consideration of the differential factors of illumination at the coal face, which in the main consists (1) of the candlepower of the source of light used; (2) the distance at which this light has to be placed from the coal face; (3) the character of the surroundings, and (4) the composition of the air at the coal face. In some detail these points are discussed as follows:

"1. The candlepower of the wax candles used in mines is generally equal to one standard candle, but the tallow candle may be equal to two. The oil safety lamp rarely gives more than one-third of a candlepower at the coal face when clean and much less when dirty. Some dirty lamps have given only one-tenth of a candlepower.

2. The candle can be placed close to the coal face, but the lamp must be placed out of danger and is always much farther from the coal face. As the intensity of illumination varies inversely with the square of the distance, the advantage of the candle is very great.

3. In the coal mine practically all the incident light is absorbed and the advantage of reflected light is lost. We do not realize how much of the lighting of interiors is due to this reflected light, but the difference between a room papered with light paper and one with a dark red paper is very obvious.

4. The light of a safety lamp diminishes when the oxygen percentage of the air falls and the presence of moisture has the same effect. The presence of gas up to 4 per cent increases the luminosity of the flame. So accurately does the safety lamp answer to the various changes in the atmosphere that a rough estimate of the oxygen percentage might be calculated by taking photometric readings of a standard oil lamp first under normal conditions and then in the different districts of the mine."

The scientific thoroughness of the investigation is further emphasized by an analysis of the amount of light falling on the coal face in a number of mines. In five open light mines the average illumination at the coal face was 0.09 foot candle, against an average illumination of only 0.018 in eight safety lamp mines, or only about one-fifth of that in an open light mine. The relation of the amount of holing done combined with different kinds of illumination on the prevalence of nystagmus is further shown in the form of a table, which fully sustains previous conclusions.

Bearing of amount of holing combined with different kinds of illumination on the prevalence of nystagmus.

District	Amount of holing	Position of miner at work	Thickness of seam	Character of illumination	Prevalence of nystagmus
			Feet		
Somerset	Much	On side	1½ to 3½	Candles	Unknown
Forest of Dean	do	do	2 to 4	do	do
Open-light pits, South Wales	do	On side or knees	2½ to 5	do	Rare
Safety-lamp pits, South Wales	None	On knees or standing	3½ to 6	Safety lamps	Common
Midlands	Much	On side	5 to 7	Lamps	do

VISUAL DEFECTS AND EYE ACCIDENTS.

Aside from the mechanical factors influencing the rarity or frequency of nystagmus, the personal factor requires to be taken into account. Llewellyn points out that the importance of the personal factor is now recognized by a large number of surgeons and that ocular defects play an important part in determining whether a man should have nystagmus. He sums up his own investigations in the statement that, aside from 225 negative cases which either were not examined or were obviously in too bad a condition to admit of a test, there were only 95 cases of normal vision. The number of men with serious errors of refraction was 430, or 81.9 per cent of the cases examined. The kinds of visual impairment were as follows: Hypermetropia, 170; myopia, 57; and astigmatism, 203. It is properly pointed out that a small error of refraction is common in normal persons, and furthermore that accidents and ill health are also determining factors. These observations, however, do not detract from the profoundly significant statement that, underlying the mechanical problem of defective illumination is the equally important question of fundamental errors of refraction, for which there is only one remedial agency known, and that is suitable glasses, which can not very well be worn underground. Accidents and ill health, however, are of sufficient importance to require some consideration, and according to the present investigation in 146 cases there was a previous history of an accident, in 73 cases to the eye, in 43 cases to the head, and in 30 cases the injuries were general. In North Staffordshire, it is further stated, accidents to the eye occur frequently before the onset of nystagmus. In the first 600 cases examined there was a history of accidents to the eyes in 36 cases, and in the last 150 cases, all from North Staffordshire, there had been injuries to the eyes in 37 cases, or 24.7 per cent. The final observations by Lewellyn have reference to preventive treatment, and are briefly summarized as follows:

"It is in the first place necessary to improve the miners' lamp, and the mining engineer must no longer be content with an average illumination of one-fiftieth of a foot candle at the coal face. The introduction of electric lamps into general use is probable, as it seems unlikely sufficient light can be obtained in any other way. The elimination of unfit workmen by medical examination before employment would also be of the greatest service. Efficient ventilation and any hygienic measures will also help."

ESTIMATE OF NYSTAGMUS IN THE UNITED STATES.

The statistical application of the foregoing considerations to the coal mining industry of the United States is rather limited at present. No trustworthy data exist which warrant more than an approximate estimate of the probable number of nystagmus cases among American coal miners. According to the statistics of the Bureau of Mines the number of men employed underground is estimated at 596,470 for the year 1913.[40] As the average rate of new cases of nystagmus reported under the British workmen's compensation act during the five years ended with 1912 had been 9.2 per 10,000 employed, this rate, when applied to the total number of persons employed in coal mining in the United States in the year 1913, given by the Bureau of Mines as 747,644, would indicate the possible, if not probable, existence of 688 new cases of nystagmus per annum. As the cumulative rate of old and new cases under the English experience by the year 1912 had reached 29.8 per 10,000, this would indicate a possible, if not the probable, number of persons employed in American coal mining and affected with nystagmus as numbering 2,228 for the year 1913. These rates are unquestionably conservative, for they are far from the 5 per cent of ascertained cases for certain mining districts of Germany. If the proportion of American coal mine employees affected with nystagmus were as high as 5 per cent, the number of such cases estimated for the year 1913 would be 37,382.

NYSTAGMUS STATISTICS OF THE UNITED KINGDOM.

The following table exhibits the cases of nystagmus among miners in the United Kingdom who received compensation under the workmen's compensation act during the five years ended with 1912. The number of coal miners has been derived from the annual reports of the chief inspector of mines and quarries, and the number of new cases, and new and old cases combined, from the annual statistics of the operations of the workmen's compensation act.

Cases of miners' nystagmus compensated for under the workmen's compensation act, United Kingdom, 1908-1912.

Year	Number of coal miners	Data on nystagmus			
		Number of new cases	Rate per 10,000 coal miners	Number of old and new cases	Rate per 10,000 coal miners
1908	972,232	386	4.0	460	4.7
1909	997,708	631	6.3	1,011	10.1
1910	1,032,702	956	9.3	1,618	15.7
1911	1,049,897	1,374	13.1	2,518	24.0
1912	1,072,393	1,376	12.8	3,195	29.8
Total	5.124,932	4,723	9.2		

The table emphasizes the importance of miners' nystagmus as an occupational disease. This aspect of the problem is briefly reemphasized in the following introductory remarks to an extended address on miners' nystagmus in a course of lectures delivered before the Royal College of Physicians of London by Shufflebotham:[73]

"Miners' nystagmus must be regarded as the commonest of all occupational diseases. This may be due to the fact that the mining industry is, after agriculture, the largest industry in the country. In my opinion the number of cases of miners' nystagmus far exceeds the numbers which would be given in compensation statistics, which take account only of cases in which undoubted incapacity for work has been produced, and not of the much larger numbers of early cases in which the patients are able to continue in their employment."

NYSTAGMUS AS AN INDUSTRIAL DISEASE.

The subject of nystagmus is referred to for the first time at some length in the home office report on the statistics of compensation for the year 1912.[79] An extract follows:

"The figures for nystagmus are remarkable. In the first full year (1908) during which the new provisions as to industrial diseases were in operation, the number of nystagmus cases was 460 (of which 386 were new cases and 74 continued from the last half of 1907); 380 of these cases were continued into 1909, and 631 new cases arose, or 1,011 cases in which compensation was paid in 1909; 662 of these were continued into 1910, and 956 new cases arose, making a total of 1,618 cases in 1910; 1,144 were continued into 1911, and 1,375 new cases arose, making a total of 2,519 in 1911; 1,819 cases were continued into 1912, and 1,376 new cases arose, making a total of 3,195 in 1912. In 1908 the remedy was still probably unfamiliar, but a comparison of 1912 with 1909 shows that the number of new cases arising annually has more than doubled. The 1912 figures, however, show that the growth in the number of new cases has stopped for the present. What is perhaps more important is that the figures of 'continued cases' show that the proportion of long-continued disablement cases is very high; the number of cases continued from 1911 to 1912 greatly exceeds the number of new cases that arose in 1911. It is evident that the adoption of means to prevent the occurrence of this disease, which the most recent investigations attribute to insufficiency of the light by which miners do their work, is becoming a matter of importance to the employer."

The report states that during 1913 there was a further increase in the number of new cases of nystagmus, the statement in the report being as follows:

"As regards nystagmus, attention was drawn, in the corresponding section of the introduction to the statistics for 1912, to the remarkable increase which has occurred each year since 1908 in the total number of cases of this disease in which compensation has been paid, but it was noted that in 1912 the growth in the number of new cases had, for the time being, stopped. The figures for 1913, however, show again a striking increase both in cases continuing from the previous year and in new cases."

ESTIMATE OF COMPENSATION COST.

It is regrettable that the statistics for nystagmus should not be given in sufficient detail as regards the total and average amounts paid in compensation and the average duration of the illness. As the large majority of cases of compensation on account of industrial diseases in the mining industry of Great Britain were for nystagmus, it would seem reasonably safe to apply the figure thus obtained to the cases compensated for during the year 1912. The average amount paid in compensation on account of nonfatal cases of industrial disease in the mining industry was £14.43 ($70.22). If this amount is applied to the 3,195 cases compensated during the year, the approximate total cost of workmen's compensation on account of nystagmus in the United Kingdom for the year 1912 was $224,353. If the same amount were applied to the estimated number of nystagmus cases in the United States (2,228), the corresponding amount for the year 1913 would be $156,450.

CONCLUSIONS OF COMMITTEE ON INDUSTRIAL DISEASES.

A full discussion of the compensation paid to workmen for nystagmus is contained in the first report of the Departmental Committee on Compensation for Industrial Diseases.[24] In that investigation it was emphasized that the burden of proof should rest on the employer, that the disease was caused by insufficient light and also by the strained position of the head and eyes, that the diagnosis was fairly easy but that the first stage of the disease might easily be ignored, that complete incapacitation from the disease was rare, so that malingering was both possible and seemingly not uncommon. It was furthermore brought out that the proclivity to the disease was incurable, that the proportion of colliers affected was held by different witnesses to be rather variable. A rest or change of occupation was considered necessary for a cure, the burden of responsibility being placed upon safety lamps producing inadequate illumination. Upon the basis of the data procured the committee recommended that miners' nystagmus be added to the schedule. As their observations on the subject are of historical and practical interest they are given in full as follows:

"Nystagmus.—This disease is prevalent among miners in certain districts, especially where the coal seams are thin. It is due primarily to fatigue of the elevator muscles of the eyes from the constrained position, in an oblique upward direction, in which the eyes have to be kept. Insufficiency of light from the lamp would appear to be a secondary but not inconsiderable cause. The miner mainly affected is the hewer who works at the coal face, but deputies in low seams, the on-setter in charge of the cage, and others also, may, and do, suffer. The objective symptom is an oscillation of the eyes (nystagmus), the rate varying from 100 to 300 times per minute, and associated with it subjectively are headache, giddiness, and dancing of objects before the eyes, which cause frequently much discomfort, and occasionally incapacitate the miner entirely from work. The malady, as a rule, does not occur under 30 years of age, and rarely until after 10 years from commencement of work. Recovery may be expected on cessation from pit work in 3 to 12 months' time, but long before this, in a few weeks, in the majority of cases, work not involving the particular eye strain is possible. Cases of nystagmus, as regards degree of incapacity, were classed for us by Dr. Meighan, surgeon to the Glasgow eye infirmary, in three groups: (1) those in which the patients are slightly affected and do not cease work; (2) those in which the oscillation is accompanied by giddiness, and where the men have to leave off their particular work underground; and (3)) those where the men are obliged to cease work altogether. He considered that 5 per cent of men employed in mines would represent the number who sought treatment under one or other of the three classes, but that the first class would embrace most of the cases. The weight of evidence, however, was strongly in favor of the view that no matter what stage nystagmus might have reached when medical advice for symptoms due to it was sought, pit work should be entirely relinquished on the ground that this course alone would prevent aggravation. This view was expressed notwithstanding the fact that miners who had undergone treatment for nystagmus five or six years previously and been cured, were known to have resumed their ordinary work again and continued in it without, so far as the witnesses knew, further injury. The data on which this medical practice is based do not appear to us, from the evidence, to be entirely conclusive, and in some cases, perhaps, the advice appears to have been given as the result of dogmatic statements made on the subject rather than of actual experience. The importance and far-raching character of this medical conclusion will at once be apparent, when it is remembered that the most prominent point brought out by the evidence in regard to the disease was that, although its existence can be easily diagnosed, the symptoms are largely subjective, and there is no necessary relation between the severity of the disease and the degree of incapacity. In other words, one man may exhibit a very marked oscillation of the eyes, and yet suffer little discomfort, and be able and willing to continue at his work; another may show overt symptoms less acute, and yet may claim, and claim truly, that he is incapacitated from his usual employment. This fact may perhaps give rise to difficulty in settling disputed cases of compensation. But since the only prospect of curing nystagmus is for the sufferer to abandon, if not altogether, at least for a time, employment below ground in badly lighted mines, it is clear that nystagmus may furnish a legitimate ground for compensation, even if the overt symptoms are comparatively slight. For the patient, though he may not at the time be actually unable to continue his work, ought to discontinue it if he is not to get worse; and if the result is that, under medical advice, he has to accept employment above ground at a lower wage, he is, in the words of the act, "disabled * * * from earning full wages at the work at which he was employed."

MALINGERING.

The question of malingering, on the alleged ground of incapacity from nystagmus, is one of considerable importance. As observed by Oliver:[64]

> "The symptoms are entirely subjective, and there is no necessary relation between the severity of the oscillation and the degree of incapacity for work. Miners' nystagmus has been scheduled for compensation, but the fact just alluded to is sure to raise difficulties in settling disputed cases of compensation, since one coal miner may suffer little, although the subject of marked oscillation of the eyes, while another with less prominent signs may experience so great discomfort as truly to unfit him for work."

A review of the literature on malingering fails to sustain the conclusion that the tendency to obtain compensation by fraud on account of impairment due to nystagmus is at all common. The most recent work, by Collie,[26] mentions only two cases, which are not applicable to the present discussion.

There are also no references thereto in the treatise by Harbaugh.

CLONIC SPASM OF THE EYELIDS.

There is a reasonable chance of confusing clonic spasms of the eyelids with nystagmus, a matter that was rather fully considered in a special report of the Departmental Committee on Compensation for Industrial Diseases.[25] It is observed in this report that—

> "The necessity for some investigation concerning clonic spasm of the eyelids (that is, spasmodic contraction and relaxation of the muscles of the eyelids) was indicated by suggestions that miners suffering from such spasm had been refused certificates of compensation because they did not exhibit the symptom nystagmus (that is, oscillation of the eyeballs), though the disease nystagmus was already scheduled by the Secretary of State's order of the 22d of May, 1907. The inquiries subsequently made by you of ophthalmic specialists and others had revealed considerable divergencies of experience and opinion as to the existence and nature of such a

spasm, particularly to a disabling extent, apart from nystagmus; some authorities suggested that it was a variety of nystagmus, others that it was at any rate a symptom of that disease, and others that it was merely a habit. The questions involved were therefore referred to this committee."

The subject of clonic spasms of the eyelids is briefly referred to by Shufflebotham,[73] as follows:

> "Clonic spasm of the eyelids is a common and in some cases the most prominent objective symptom. Sometimes it is an early, sometimes a late symptom, and very often it may remain after the oscillation of the eyeball has ceased. Llewellyn has pointed out that the movements of the eyelid associated with nystagmus are of two kinds, the coarse blinking movement and the fine tremor or clonic spasm, and in the former, although the movements may be quick, they are tonic and not clonic in nature. The rapidity of the clonic movements may exceed 100 a minute, and in some cases the movements may be so quick that it is impossible to count them. These movements may be exaggerated and made more obvious by adopting the same means as in oscillation of the eyeballs."

After considering all the evidence available the committee[25] came to conclusions as follows:

> "We find that the word 'nystagmus' is no more than the name of a symptom, and can not conveniently be employed to name a disease. It denotes only oscillation of the eyeballs. 'Miners' nystagmus,' on the other hand, is a term well understood to name a disease or group of symptoms, practically confined to miners, of which oscillation of the eyeballs (that is, 'nystagmus') is the commonest, but not invariably present, objective sign. This disease has many symptoms, some subjective and some objective. We have no doubt that during its course, at some time or other, the symptom nystagmus appears in all cases. That is the conclusion we have come to on the evidence of those who have had the greatest experience, but we can not deny that, among those we heard, much diversity of opinion was expressed as to whether it is present at all times, or even susceptible of elicitation by repeated tests under conditions favorable to its perception. And, in some cases, accompanying it, or in others even replacing it in the

later stages, may be clonic spasm of the muscles of the eyelids. Consequently the symptom nystagmus, however easily found in a great majority of cases, ought not in all to be taken as a conclusive test either of the presence or of the absence of a disease of which, after all, it is but one symptom. We find further that the suggestion that it has been taken as such a test is not altogether unfounded. We are satisfied that cases of miners' nystagmus may have been wrongly diagnosed, and that certificates of disablement are likely to be refused, through too much insistence on this one test; and we are convinced that it is necessary to make it abundantly clear to all those concerned in the administration of the act or in the diagnosis of cases that the condition, the existence or nonexistence of which to an incapacitating extent is to determine the question whether there can be a claim to compensation, is not the symptom nystagmus alone but the whole disease known as 'miners' nystagmus.' We also find that it is not sufficient and for various reasons would not be proper merely to call attention also to the additional symptom clonic spasm; all the symptoms, whether subjective (for example, movements of objects, headache, giddiness, night blindness, and dread of light) or objective (for example, movements of the eyeballs, tremor of the eyelids, eyebrows, head, and even of the neck and shoulders) must be taken into account. The question for decision is: 'Do the symptoms present in this individual, the objective symptoms and the subjective symptoms taken together, with or without the history of the case and the other available evidence, show that he has miners' nystagmus to such an extent that he is wholly or partially incapacitated within the terms of the act.'

As regards the point raised in McGinn v. Udston, we find that the word 'nystagmus,' being only the name of a symptom, either names no disease at all and so gives no title to compensation, or (and this is the interpretation on which the court acted) includes nystagmus even when it is a symptom of forms of disease (for example, Friedreich's ataxia, disseminated sclerosis, and tumor of the cerebellum) that are not industrial.

In view of the evidence given to us and the facts disclosed by recent researches as to the causation of miners' nystagmus by inadequate illumination at the coal face and elsewhere in the mine, we entertain the gravest doubt whether true miners' nystagmus can ever occur in persons other than miners. The committee of 1907, however, seem to have had such cases in mind (for though in the body of their report they referred to 'miners' nystagmus,' in their recommendation they spoke only of 'nystagmus'). We are therefore of opinion that any amendment of the existing schedule should be so framed as to preserve the existing claim to compensation for cases of miners' nystagmus in persons other than miners, if such cases occur."

The "minutes of evidence" are of unusual value, including observations on the predisposition to miners' nystagmus, causation, and its occurrence in nonminers as well as its practical limitation to persons employed in the coal mining industry. The symptoms are fully discussed, and the evidence collected on some points is rather technical. Clonic spasms of the eyelids by some witnesses was not considered a separate disease. Its connection with conditions other than miners' nystagmus, and its differentiation from other forms of blinking, were fully brought out. The subject of incapacitation by miners' nystagmus was considered, as was the subject of symptoms, as well as the chances of simulation or malingering and the risk of recurrence.

CONCLUSIONS.

In view of the foregoing, it would seem extremely improbable that an occupational affliction so well defined should be wholly absent in the coal-mining industry of the United States. General investigations are not likely to yield useful results, but specialized inquiries should be directed exclusively to underground employees in mines using exclusively or extensively safety lamps as a precaution against mine explosions. Even though some of the apparent increase in the frequency rates of nystagmus for the United Kingdom be attributed to malingering because of the compensation paid on account of incapacity for work, it would seem reasonable to suppose that more cases of malingering or fraud would have been reported than are shown by the available records. The economic importance of nystagmus as shown by German data is set forth in a summary statement, derived from the statistical reports of the Bochum Miners' Union,[1] exhibiting the proportion of compensated nystagmus cases in the invalidity cases due to all causes, by divisional periods of life.

Invalidity cases on account of nystagmus in the Bochum Miners' Union, 1908-1912.

Age groups of miners	All invalidity cases	Nystagmus cases	Invalidity due to nystagmus
Years			*Per cent*
Up to 20	330		
21-25	790	49	6.2
26-30	1,713	280	16.3
31-35	2,691	718	26.7
36-40	2,660	784	29.5
41-45	2,324	705	30.3
46-50	2,766	539	19.5
51-55	2,866	269	9.4
56-60	1,836	76	4.1
61-65	724	11	1.5
66-70	164	2	1.2
Over 70	39		
Total	18,903	3,433	18.2

It is shown by this table that of all the invalidity cases on account of which compensation was paid, 18.2 per cent were the result of nystagmus. The actual number of such cases was highest at the ages of 36 to 40, and the relative proportion was highest at the ages of 41 to 45. It has not been feasible to reduce these cases to the basis of a rate per 1,000 employed, by divisional periods of life, but the above table is entirely conclusive evidence that nystagmus is largely an affection of coal miners at the age of 31 to 50 years, when 19.5 to 30.3 per cent of all invalidity requiring compensation is due to this single and well defined specific cause of disablement.

The relative frequency of the disease in the Bochum mining district is a matter of considerable practical importance. It may be questioned whether the subject has anywhere else received such extended and strictly scientific consideration. The activities of the Bochum Miners' Union are confined chiefly to the administration of the sick fund and of the invalidity insurance fund. The number of cases of nystagmus to which the sick fund was applied during the period 1905-1913 are shown in the following table:

Number of cases of miners' nystagmus to which sick fund of Bochum Miners' Union was applied, 1905-1913.

Year	Members in union	Cases of miners' nystagmus	Nystagmus cases per 1000 members
1905	269,000	970	3.61
1906	286,000	903	3.16
1907	309,000	1,098	3.55
1908	343,000	818	2.38
1909	348,000	1,333	3.83
1910	351,000	1,225	3.49
1911	357,000	1,371	3.84
1912	376,000	1,510	4.02
1913	409,000	742	1.81
1905-1909	1,555,000	5,122	3.29
1910-1913	1,493.000	4,848	3.25

These figures show that during the last four years covered by the table the average nystagmus rate has been practically the same as during the first five years covered; but that although the rate during 1912 was the highest on record, or 4.02 cases per 1,000 members exposed to risk, the rate for 1913 was only 1.81, or the lowest on record during the nine years under observation. The actual number of cases during 1913 was almost exactly one-half of the number requiring the application of the sick fund during 1912. However, the medical report of the Bochum Miners' Union for 1913 explains that the reduction is not to be explained on account of a diminished frequency, but in conformity with a decision of the superior court that only the most serious cases of nystagmus were to be considered entitled to compensation in the future.

Much the same result is obtained by an analysis of the invalidity cases to which the fund was applied during the same period, as shown by the following table:

Number of cases of miners' nystagmus to which invalidity insurance fund of Bochum Miners' Union was applied, 1905-1913.

Year	Members in union	Cases of miners' nystagmus	Nystagmus cases per 1,000 members	Cases with secondary complications	
				Number	Per cent of nystagmus cases
1905	263,000	463	1.76	107	23.1
1906	280,000	590	2.11	126	21.3
1907	301,000	432	1.43	72	16.7
1908	332,000	406	1.22	43	10.6
1909	340,000	757	2.23	61	8.1
1910	341,000	824	2.42	105	12.7
1911	348,000	797	2.29	73	9.2
1912	367,000	649	1.77	78	12.0
1913	396,000	195	.49	30	15.4
1905-1909	1,516,000	2,648	1.75	409	15.4
1910-1913	1,452,000	2,465	1.70	286	11.6

According to this table the invalidity rate on account of miners' nystagmus was 1.75 per 1,000 during the first 5 years and 1.70 per 1,000 during the last 4 years covered by the table. The reduction in the number of cases during 1913 is even more marked as regards invalidity cases than as regards sickness cases. The table includes a column showing the cases of nystagmus with secondary complications, and the proportion of such cases to the total number of miners entitled to invalidity annuities on account of temporary or permanent wage-earning incapacity as a result of nystagmus. The percentages show a wide range, from a minimum of 8.1 in 1909 to 23.1 in 1905. The percentages, of course, would be affected by special causes such as, for illustration, bronchial catarrh, pneumonia, and other respiratory diseases influenced by season. Out of a total of 5,113 cases of miners' nystagmus during 1905-1913, 695, or 13.6 per cent, were complicated by other causes or diseases, as follows: Other eye diseases, 262, or 5.1 per cent of the total number of nystagmus cases; other diseases of conjunctive tissue membrane and eyelids, 68, or 1.3 per cent; pulmonary emphysema and asthma, 104, or 2 per cent; acute and chronic articular rheumatism, 81, or 1.6 per cent; muscular rheumatism, 68, or 1.3 per cent; other causes or diseases, 367, or 7.2 per cent. To the pathologist, the significant fact brought out by these statistics is the large number of cases complicated by other diseases of the eyeball or of the conjunctive tissue membrane and the eyelids.

These additional observations further emphasize the practical importance of miners' nystagmus as an occupational disease. The modern tendency of including occupational diseases within the scope of workmen's compensation for accidents or injuries suggests the practical importance of a more extended consideration of the subject. As shown by the accompanying bibliography, there have been few useful and conclusive American contributions to the literature on nystagmus. Aside from the brief consideration of nystagmus in Thompson's treatise on occupational diseases, a still more limited consideration by Lloyd may be mentioned chiefly on account of two interesting illustrations of the constrained positions under which miners' nystagmus is, according to some authorities, most likely to occur. Such mining practices, however, are comparatively rare in the United States on account of the relative infrequency of narrow coal seams and the more extended use of coal mining machinery. No reasons suggest themselves, however, why this peculiar affliction should be limited to mining districts of European countries and not be found in American coal mining districts where, on account of the gaseous nature of the mines, the use of safety lamps is compulsory.

As shown by the European experience, the affliction is not likely to attract general attention until compensation is required to be paid for it. Llewellyn's estimate of compensation cost on account of miners' nystagmus in the United Kingdom, placed by him at nearly half a million dollars a year, is probably too high. However, if this country under liberal workmen's compensation laws should include compensation for industrial diseases, the problem of miners' nystagmus, aside from its humane considerations, will probably become much more important than it seems at present.

The information here presented should, however, serve the purpose of attracting general medical attention to an obscure affliction which, under existing conditions, may be erroneously diagnosed and neglected, when remedial measures would be of decided advantage to the miner and the mining industry.

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ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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On the Cause of the Ophthalmoscopic Appearances in Amaurotic Family Idiocy.

Coates, George (*Ophthalmoscope*, April, 1916). The paper deals with the histology of the retina in amaurotic family idiocy, especially with the points of differentiation from "family cerebral degeneration with macular change."

Briefly the changes in family cerebral degeneration are as follows: (1) Certain cytologic degeneration of the ganglion cells; (2) a diminution amounting in places to a complete disappearance of these elements; (3) edema of the outer nuclear layer; (5) thickening of the supporting elements; (6) immigration of pigment into the outer layers of the retina.

Of these, only the first two are present in amaurotic family idiocy, and in the case examined by the writer the diminution in the number of ganglion cells was much less than the degree of degeneration would lead one to expect. In spite of a close similarity or identity of the changes in the ganglion cells, the fundamental pathology of the two conditions is different.

As compared with obstruction of the central artery of the retina, amaurotic family idiocy furnishes an example of a condition, which, although demonstrably confined to the inner layers of the retina, without edema of the outer, yet produces a white area in the macula and a cherry spot; there is nothing improbable, therefore, in similar ophthalmoscopic appearances being due, in the case of obstruction of the central artery also, to a condition confined to the inner layers of the retina without edema of the outer. Not the same condition, of course: in the first case it is a chronic degeneration of the cytoplasm which is more or less permanent; in the second, an acute coagulation necrosis due to cutting off of the blood supply, and disappearing when the necrosed tissues become absorbed.

W. R. P.

A Note on Spontaneous Hemorrhage From the Conjunctiva.

Wallis, G. F. C. (*Ophthalmoscope,* April, 1916), reports two cases of spontaneous external hemorrhage from the conjunctiva. The first case is summarized as follows:

Case of a girl twelve years old, a pupil at a private boarding school, who had two attacks of bleeding from the right eye, with an interval of two months between. The hemorrhage, of about two drams in quantity, and venous in type, arose from a localized hyperemic area of the conjunctiva and episclera, in the neighborhood of the lower fornix. On a third occasion the appearances were clinically identical, but no bleeding took place. Premonitory edema of the lids set in on the preceding day before all attacks. Willful traumatism excluded. Apparent relation to the catamenia. This affection was possibly of the nature of episcleritis periodica fugax.

The second case was due to the presence of a small flat fibroma, visible upon everting the upper lid. It occurred in a young woman of twenty-seven years, who complained of bleeding from the right eye upon several occasions, sufficient in amount to soak two handkerchiefs. By inspection the eye appeared normal, but on everting the lid a thin fibroma attached by a very narrow pedicle became visible. No hemorrhage followed its removal.

The first case belongs to the class of cases of spontaneous hemorrhage occurring during the menstrual period. The first attack antedated by about a month the beginning of the menstrual function; the second occurred about a month after the first catamenial period, apparently taking the place of her second period, which was missed; and the third attack, unassociated with loss of blood, took place during a normal physiologic menstrual flux.

The clinical features in this case, including the prodromal swelling of the lids, were very like that of episcleritis periodica fugax, and it is possible that this was an atypical attack. However this may be, it would seem that, given an intense hyperemia situated in the conjunctiva and episclera at the transition to the fornix, where there is a plexus of veins (Fuchs), a resultant hemorrhage would not be an entirely unexpected event. W. R. P.

A Clinical Study of Fifty-five Cases of Intraocular Retention of Foreign Bodies, With Results Two Years Afterwards.

BROWNLIE, W. BARRIE (*Ophthalmoscope*, May, 1916). The continuation of this article deals with a short description of the fifty-five cases, classified under the following headings:

1. Number of the case.
2. The eye affected.
3. The position, and character of the wound.
4. Other complications and the special points under naked eye and ophthalmoscopic diagnosis.
5. The visual acuity of the injured and uninjured eye.
6. The interval between date of injury and the patient first presenting himself.
7. The X-ray place.
8. Position of foreign body.
9. Magnet and other operations and subsequent complications.
10. Results two years after.

The first twenty-one cases are tabulated in this number of the journal. W. R. P.

Pneumococcal Infection of the Eye.

Ridley, N. C. (*Ophthalmoscope,* May, 1916), reports a long continued case of iridocyclitis, evidently due to pneumococcal infection. The case suggested tuberculous origin because of the localization of the affection to certain parts of the iris while other parts were free, patchy foci in the ciliary body, and the history of attacks of pleurisy. Tuberculin treatment was of no avail, and further careful examination was made. Pneumococcic foci were found at the dead roots of some teeth mixed with streptococci. The postnasal region also showed large numbers of pneumococci and some streptococci. The blood gave a pure culture of pneumococci, and the feces showed enormous numbers. All other general examinations were negative.

The combined pneumococcal and streptococcal vaccin was administered, but each injection was followed by an acute attack, although smaller doses were used each time. The vaccin was stopped for six weeks, during which the relapses occurred frequently. The vaccin was again started and continued at intervals of seven to ten days with good results. The offending teeth had been extracted early, and local treatment, as well as general treatment, carried on in addition to the vaccin therapy.

The prognosis is given as rather hopeful for a useful eye, with complete cessation of attacks.

Pneumococci inhabit practically one hundred per cent of all normal mouths, bronchi and conjunctival sacs at one time or another. (Axenfeld, eighty-eight per cent.)

Whenever there is a local point of active pneumococcal infection the cocci almost invariably manage to enter the blood stream. Thus, in ordinary lobar pneumonia careful blood cultures will show septicemia to coexist.

This septicemia produces not necessarily a high temperature, but general toxemic symptoms, malaise, limpness, low blood pressure, etc.; in short, there seems to be no end of the variety of acute pneumococcal infections, in all of which the pneumococcus may get into the blood stream.

It is not surprising that in such cases of toxemia the uveal tract can be easily attacked, especially when its resistance is weakened by prolonged exposure, overstrain or traumatism of any kind.

The pneumococcus exerts its morbific influence by means of an endotoxin. It is not liberated until it is freed by leucocytic digestion of the coccus. In consequence, the attack of systemic infection does not produce any large amount of antibodies in the serum.

Immunity after attack is of short duration, perhaps only two or three weeks. One pneumococcic infection rather tends to render the individual more susceptible to another. Remembering this in connection with a local point of chronic pneumococcal sepsis, in which also uveal infection has occurred, it can be seen that so long as a septic focus remains, constant relapses and crises will tend to occur in the uveal condition, due to rapid reinfection of the blood stream and the absence of the antibodies, there being the necessity of a fresh leucocytosis before the attack can be stopped. W. R. P.

Divergent Concomitant Strabismus—The Muscular Anomalies and Refractive Errors Accompanying It, and Its Treatment.

Woolton, H. W. (*Ophthalmoscope,* 1916), discusses the divergent form of concomitant strabismus. This form is of especial interest because, first, it is far less common than the convergent form; the etiology of its various types, in so far as relates to the muscular anomalies present, has been less thoroughly described. Second, the difficulties attending its rectification by surgical procedures are generally held to be greater than those connected with the correction of convergent strabismus. Lastly, amblyopia of the squinting eye defying improvement by correction of the refractive error is by no means as common, and, if we believe that the irremediable amblyopia of strabismus is for the most part congenital and not acquired, does not seem to present itself as an etiologic factor as frequently as in the convergent variety.

On the basis of the predominating muscular error, the writer classifies divergent strabismus as follows:

1. Divergence excess; hypermetropia frequent; myopia rare.
2. Convergence insufficiency; myopia frequent; hypermetropia rare.
3. Divergence excess (marked) and convergence insufficiency; anisometropia frequent; bilateral myopia and bilateral hypermetropia less frequent.

The order given is in the order of frequency in his experience.'

The determination of the muscular anomaly or anomalies existing in any case of divergent strabismus is exceedingly simple. In uncomplicated cases of divergence excess the deviation exists only when the patient gazes at distant objects; or, if it be present, although to a less degree, for near points, the power of convergence can be shown to be practically unimpaired by insisting that the patient shall attempt fixation of some test object, such as the point of a lead pencil gradually brought nearer to him in the middle line. In typical cases, which are very frequent, he will maintain bilateral fixation until a point within three or four inches of the root of his nose is reached. Obviously, when this is the case, convergence insufficiency cannot be present. In uncomplicated convergence insufficiency the squint will be more marked for near than for distant objects, one eye diverging more and more as the pencil approaches the face. When both divergence excess and convergence insufficiency are present, the deviation will be marked during both distant and near vision, and the power of convergence will either be entirely absent or will manifest only to a slight degree. In all pure cases of divergence excess the extent of the external rotation of each eye will be found to be markedly increased, and not infrequently to comprise an arc of seventy degrees.

In the treatment of divergent strabismus it is generally held that our first endeavor should be to correct the refractive error, and that, after such correction, a cure may result without resort to operative measures. A cure may thus be obtained, but only in those cases in which myopia fairly equal in degree is present in both eyes, and in which convergence insufficiency is the sole, or greatly predominating, muscular anomaly. Correction of the refraction produces no effect when the deviation is due to a divergence excess. It follows, then, that most cases of divergent strabismus necessitate operative measures for their cure, and the results are, generally speaking, exceedingly satisfactory and frequently perfect, if we are guided in our choice of operation by the muscular anomaly present. The most frequent cases are those of bilateral hypermetropia associated with divergence excess, and in these the proper procedure consists of a free tenotomy of both externi, repeated, if necessary; and this is no less true when, as is rarely the case, the divergence excess is accompanied by bilateral myopia. In the hypermetropic cases, even if a fairly well marked convergence insufficiency coexists, the tenotomies should constitute the primary measure, and should be persisted in until the deviation is corrected for distant vision.

Cases of myopia associated with convergence insufficiency, in which the deviation persists after full correction of the refractive error, require the advancement of one, or more generally of both, interni; and in no circumstances should tenotomy of the externi be performed in pure cases of this type. When both divergence excess and convergence insufficiency in marked degree are associated, the predominating muscular error, which, except in cases of bilateral myopia, is usually the divergence excess, should be first attacked by means of free tenotomies of the externi. W. R. P.

Temporary Blindness From a Penetrating Bullet Wound of the Occipital Lobe.

Moore, A. E. (*Lancet,* August 21, 1915), reports a case of complete temporary blindness following a bullet wound of both occipital lobes. Vision returned so that on the fifteenth day patient was able to read ordinary print. From the rapidity of recovery it is evident that blindness was due mainly to concussion, yet it seems extraordinary that a bullet could pass through both occipital lobes without causing some permanent interference with vision, as there must have been some destruction of brain matter.

The patient was never examined with a perimeter, but as far as could be determined by rougher methods, his fields of vision, including the fields for colors, were normal within three weeks from the time of injury.

The completeness and rapidity of recovery in this case support the opinion, now becoming more general, that in many cases of gunshot wounds of the head operative measures should be delayed. N. M. B.

Shrapnel Located at Back of Orbit; Successful Extraction.

Collins, W. J. (*Lancet,* October 2, 1915). The right eye showed great chemosis, the conjunctiva overlapping the cornea and rendering separation of the lids difficult and painful. There was slight proptosis. The anterior chamber contained a little grayish green pus, and there was no vision. The vision of the left eye was normal, pupil active, no photophobia. No external wound in the neighborhood of the right orbit could be detected. A radiogram showed a large fragment of shrapnel, apparently situated deeply in the right orbit adjacent to the base of the skull. Twenty-four days after injury the right eye was enucleated and the fragment of shrapnel removed.

Presumably the foreign body had entered through the palpebral fissure and passed between the globe and inner wall of the orbit. N. M. B.

Nystagmus and Allied Conditions.

Wilson, J. A. (*Lancet*, October 23, 1915). Details of two hundred consecutive cases are reported. The ages of these patients indicate that nystagmus is more prevalent in youth and that it tends to disappear in adult life. Sex: Males, one hundred and five; females, ninety-five.

Excluding the young children, eighty-eight per cent of the eyes had bad vision—that is, 6/18 or worse. Only six cases had good or fair vision in both eyes, and these are: Hereditary nystagmus, one case; miners', five cases.

Emmetropic or normal refraction is found in the following cases: Miners'. five; hereditary nystagmus, one; corneal opacities, one; corneal opacities, three; optic atrophy, six. In all the other cases there are errors of refraction and defective vision.

There are twenty-four miners in the series, and the refractive conditions in these cases are: Myopic, ten; hypermetropic, five; emmetropic, five; unknown, four.

There are eight albinos, and the refractive conditions in these cases are: Myopic, two; hypermetropic, six.

The following conditions were present: Corneal opacities, 44 cases. Ordinary cataract, 11 cases. Anterior capsular cataract, 5 cases. Optic atrophy, 11 cases. Choroiditis, 8 cases. Convergent squint, 34 cases. Divergent squint, 12 cases. Lenses dislocated, 2 cases. Buphthalmos, 2 cases.

These conditions produce imperfect retinal images, or—as in the cases of optic atrophy—prevent the transmission of retinal impressions to the brain.

Time of Onset.—This is shown below: At birth or within three months, 18.5 per cent. Over three months and under five years, 49.5 per cent. Five to ten years, 15.0 per cent. Eleven to twenty years, 7.0 per cent. Twenty-one to thirty years, 1.0 per cent. Over thirty years, 6.0 per cent. Unknown, 3.0 per cent.

Movements.—Lateral, sixty-one per cent; rotatory, sixteen per cent; oblique or irregular, thirteen per cent; vertical, six per cent; lateral and rotatory, four per cent.

Concomitancy of the Movements.—The investigation of this point is rendered much easier by the use of approximating prisms—prisms with their edges together—through which the eyeballs can be seen edge to edge or overlapped. In some cases the concomitancy could not be determined, as the movements were too rapid or were irregular; otherwise, with three doubtful cases, the movements were all concomitant—that is, both eyes rotated to the right together and to the left together, instead of diverging together and converging together, or one eye turning up while the other turned down.

Spasm of the eyelids is frequently seen in miners, especially in the later stages, but it is also present in some of his cases who are not miners.

Shaking of the head is present in several cases—nonminers; but some of these are cases of hereditary nystagmus.

Contraction of the visual fields for white and colors has been reported in miners, but he has found the same in some cases of nonminers that he has examined, but not in all.

Latency.—Among his cases is one of latent nystagmus.

Occupations.—School children, sixty-eight; housewives, thirty-one; general workers, thirty-eight; clerks, three; miners, twenty-four; no occupation, eight; infants, twenty-eight.

Defective vision from ametropia, opacities, fundus changes, albinism, want of light in the coal mine, also the effect of squint, closure of one eye, and sclerosis of the optic tracts, all operate in the same direction and produce the same result. The presence of ametropia and other ocular defects establishes a liability to nystagmus apart from the nature of the person's occupation. Nystagmus occasionally occurs in coal miners who used naked lights. The degree of darkness in which the miner labors proportionately increases his retinal deficiency.

Coal mining in which the safety lamp is employed is generally considered to be the only industry responsible for the production of nystagmus. Under such conditions of feeble illumination of the retina one only can speak of miners' nystagmus as an entity by itself; the variation is only in the method of obtaining imperfect retinal images. If a man with defective vision becomes a miner and subsequently develops nystagmus, how should the etiologic responsibility be apportioned? Perhaps the pathogenetic influence of the factors could be estimated.

Heredity.—In the process of collecting two hundred consecutive cases of nystagmus he has discovered five cases that are of the hereditary type, and after some investigation has been able to construct five pedigrees. In these pedigrees there are eighty individuals—forty-two males and thirty-eight females, and of these thirty-eight are affected—nineteen males and nineteen females. Some of the cases have fair hair and blue irides, some have dark hair and hazel or brown irides, some have good vision and emmetropic refraction, while others are hypermetropic, but many are myopic. The condition in some cases is of lifelong duration. It is almost certain that other cases on my list are really hereditary, though the connecting links are unknown. In several cases, in which there is no evidence of heredity or albinism, the movements were observed soon after birth, and these are simply termed congenital.

The associated movements of the eyelids and jaws, or "jaw winking" and other anomalous movements of lids and eyes, are discussed.

Treatment.—Ten per cent of the cases were the result of ophthalmia neonatorum. These are but other examples of the far-reaching effects of sexual impurity. Spectacles to correct errors of refraction and operative measures that may improve vision should be adopted as soon as possible. Atropin applied to the eyes sometimes makes the oscillations worse, probably by dilating the pupil and rendering the vision more defective, but its employment is necessary in estimating the refraction, and especially in those cases where there is spasm of the ciliary muscle. Eserin does not do any good—perhaps because it causes spasm of the ciliary and sphincter muscles.

The following method of treatment is probably worth a trial: Request the patient to look at one's finger, held about eight inches from the patient's eyes—a position involving a certain amount of convergence—then move the finger from side to side and get him to follow it with his eyes. After two minutes of this exercise, close his eyes for a short time and then repeat, and so on. There is usually one position of the eyes in which there is little or no oscillation; perhaps the head is thrown back and to one side. From this position movements may be commenced. In this way we may be able to train the higher centers to obtain control over the lower. This method of treatment is not suitable for young children, cases of optic atrophy, or cases with very bad vision. N. M. B.

Bright's Disease in Some of Its Clinical Aspects.

West, Samuel (*Lancet,* November 20, 1915), lays particular stress upon the ophthalmoscopic changes in Bright's disease, and thinks their significance is not as fully recognized as it should be.

Silver wire arteries, when well marked, are considered pathognomonic of granular kidney, as no other retinal lesion has that peculiar metallic luster which makes the name so appropriate. Compression of the veins is an inconstant sign, and not of the same importance as the silver streaked arteries. Tortuosity of the arteries is also mentioned, as also is retinal hemorrhages, but little stress is laid on their importance.

Albuminuric retinitis is considered the most important of all the retinal changes. The writer describes two forms which are not generally distinguished one from the other as they should be. They are described under the exudative and degenerative form.

The exudative form is similar to that seen in ordinary optic neuritis, such, for instance, as may be associated with cerebral tumor, with which he has more than once seen the diagnosis confused. This form is not rare in acute nephritis, and may completely resolve as the acute nephritis gets well. In granular kidney it is, of course, except in the rarest instances, persistent, and it is a sign that the end is not far off.

The degenerative form consists of white glistening patches, bright as cholesterin crystals or fish scales. They are found for the most part round the yellow spot, but not infrequently in other parts of the retina. They may be quite tiny and need most careful looking for, otherwise they might easily be missed. In their most striking form (the cartwheel form) they occur as long, spoke-like streaks radiating from the yellow spot, or they run together in irregular areas of considerable size. In all cases alike, even where the spots are so tiny, this degenerative form is pathognomonic, for nothing like it is seen in any other disease than granular kidney. Although what have been also called white patches occur in the exudative form, whether in connection with granular kidney or some other disease, these are less defined in shape, dull gray in color, and wholly in appearance, and in most cases easily distinguished from the sharply defined glistening white spots of the degenerative form.

In both forms alike the changes are bilateral, and generally more or less symmetric.

The two forms are quite distinct from one another, and the exudative is not, as is often stated, the later stage of the degenerative. They may be associated together sometimes, but even then are essentially independent of one another, and if the exudative form should resolve, the degenerative form would persist.

It is generally stated that albuminuric retinitis is a late symptom in granular kidney, and that in most cases the patient has at the most not more than two years to live. This is true of the exudative form; indeed, most cases die in a much shorter time—within a few weeks, it may be, of its being discovered. But the exact duration even of this form is difficult to determine, for in most cases the eyes have not been examined until the vision has suffered, and then being found fully developed, it must have existed some time before it was discovered.

The degenerative form has a much longer lease of life.

N. M. B.

Ophthalmic Notes in a General Hospital in Egypt.

WIRGMAN, C. W. (*Lancet*, November 27, 1915). Cases sent up to the hospital from convalescent camps constituted an outpatient clinic, from which any case requiring special attention was admitted. Of cases directly from the front the great majority naturally were injuries, while from the convalescent camps refractive errors were in the majority. In many of the latter it was a matter of surprise that they had ever been passed fit for service, as the defects of vision were so gross that the most casual examination could not have missed them. For example, one man had a refraction of — 8.0 sph.; another, right eye, cyl. — 5.0 hor., sph. — 3.0; left eye, cyl. — 5.0 hor., sph. 1.0. A noticeable point was that refraction without a mydriatic was in many cases impossible, owing to the spasm of accommodation. In several instances of injured from the front it would have been better if atropin had been used more freely during the voyage.

Several cases of ocular injuries from shell splinters are reported. N. M. B.

Renal Retinitis in Soldiers Suffering From Epidemic Nephritis.

Moore, R. F. (*Lancet,* December 18, 1915). The result of the ophthalmoscopic examination of one hundred and nineteen soldiers suffering from epidemic nephritis is analyzed by Moore. In five cases renal retinitis either was present or developed while the patient was under observation. Of the remaining one hundred and fourteen there were seven in whom small retinal hemorrhages were present, and one hundred and seven with normal fundi. The retinal hemorrhages in the seven cases were small and few. The average systolic blood pressure in seventy men with normal fundi was one hundred and forty-three millimeters, whereas that of the five men in whom retinitis developed was one hundred and eighty millimeters. The average interval between the date of the onset of symptoms and the ophthalmoscopic examination in those without retinitis was five and one-half weeks. In the case of the five men in whom retinitis developed, the interval between the onset of symptoms and nephritis and the development of retinitis, as near as could be judged, was seven weeks. The retinitis which developed did not differ in appearance in any essential from the retinitis of chronic nephritis. In each of the men in whom it occurred the general symptoms were severe, and in general the more severe these symptoms the more extensive were the changes in the retina. In three cases detachment occurred, and of these two cases of the transparent globular type, which are due to the presence of serous fluid in the subretinal space. In one case the detachments were of the flat variety, such as are due to the presence of solid exudate under the retina. Circular pigment spots which are produced by the proliferations of the pigment epithelium, and which are seen in a retinitis of some standing, were present in two cases. There is no doubt in Moore's mind that the great majority of these one hundred and nineteen men were suffering from a primary acute nephritis, and were not the subjects of a preexisting chronic nephritis. In four cases, in three of which retinitis was present, the blood serum was opalescent, and in two of them it was especially dense. This opacity was found to be due to the presence of lecithin globulin. The fundi in these cases did not show the characteristic picture of "lipemia retinalis." N. M. B.

The Treatment of "Concussion Blindness."

HERTZ, A. F., AND ORMOND, A. W. (*Lancet*, January 1, 1916). One of the principal ocular features of the present war is the number of cases of functional blindness due to the violent explosions caused by high explosive shells, bombs, hand grenades, etc. These cases may or may not have sustained definite organic injuries, but the clinical symptoms characterizing their functional nature are very clearly marked. Usually the patient has been rendered unconscious by an explosion in his close vicinity, and on regaining consciousness he finds that he is unable to see. When examined he presents the following symptoms: The eyes are kept closed, the lids may be frequently "fluttered"; or, as one man stated, "he could not keep his eyes from twinkling." On attempting to open the lids the patient resists forcibly by means of his orbicularis; when this is overcome to a sufficient extent to see the globes, they are found to be rolled forcibly upwards, and the pupils are always kept covered by the lids; he has great difficulty in looking downwards, and complains of pain and photophobia, and shows marked fatigue as a result of the examination. In some cases an acceleration of the pulse rate and also respiration. The photophobia is not, however, really influenced by light, as the condition does not diminish in very subdued illumination. These patients never move about as blind men would; they invariably avoid hurting themselves, but all the same they never relax, even if watched for weeks at a time, the groping action of people with extremely defective sight, and judged by every test they maintain this condition indefinitely and are undoubtedly psychically blind. The pupils react normally and the fundus shows no definite change. There is no difficulty in differentiating them from malingerers, as they pass through long periods of real mental distress and serious discomfort. These cases vary enormously in severity; some recover rapidly, others seem to go on indefinitely if not treated, or treated unsuccessfully. Any lack of recognition of the condition in the early stages greatly prejudices the prognosis. One patient having been told that he was blind, remained so for several months; whereas probably if it had been recognized earlier that he was not blind and would recover, he would have done so much more rapidly.

Early in the war the treatment tried was unsuccessful and consisted of rest, tonics, deprivation or punishments such as abstention from tobacco, confinement to bed or in isolation rooms, persuasion, encouragement, counter irritation, talking, etc. All were comparatively ineffective until suggestion and hypnosis were tried with the help of Dr. Hertz. The results have varied considerably as to rapidity of recovery, but all have shown marked improvement. Seven cases are reported in detail.

N. M. B.

Simpson Light.

HARMER AND CUMBERBACH (*Lancet*, January 8, 1916). The Simpson light is emitted from an electric arc formed between electrodes made by a special process from a mixture of the ores of certain metals, the chief one being a tungstate of iron and manganese, known as wolfram. The Simpson light is made up of rays of two kinds: 1. Visible rays: These are the visible rays of the luminous spectrum, violet, blue, green, etc., down to red; these rays together produce white light. 2. Invisible rays: These are heat rays and ultraviolet rays. It is to the latter that the therapeutic properties of the light are said to be due. At St. Bartholomew's Hospital a number of cases with various types of disease have been treated: rodent ulcer; lupus; syphilis; asthma; vasomotor rhinitis; nasal catarrh and sinuitis; otosclerosis and eczema. The

Simpson light seems to stimulate the healing of wounds. Cases of shrapnel wound have been benefited. When disease affects the deep parts or subcutaneous parts there is usually no benefit.
N. M. B.

The Signs and Symptoms of Glaucoma (Considered Individually and in Detail).

Elliot, R. H. (*Ophthalmic Review*, October and November, 1915). This masterly essay goes so into detail that it is impossible to abstract it, but should be studied in the original by every ophthalmologist. N. M. B.

Later Results of Operative Treatment of High Myopia.

Thompson, A. H. (*Ophthalmic Review*, January, 1916), says that during the last five years, probably in common with most ophthalmic surgeons, he has been decidedly chary in recommending this operation; but still maintains that in a few carefully selected cases the treatment is a good one, and tends to make the life of those patients who undergo it decidedly more satisfactory than it would otherwise have been. Since, however, one can never speak with anything like confidence of the future of these eyes, his opinion is strong that one should never press the operation on any patient, and one should be on one's guard against representing in the light of a cure a procedure which leaves the eye just as likely as before to be attacked by those destructive processes to which, as is well known, highly myopic eyes are subject. On the other hand, it has, in his opinion, yet to be proved that after a successful operation in a well selected case, the eye is any more subject to those same destructive processes than it would have been if it had been left alone. Meantime the patient, at any rate for a time, enjoys the advantages of greatly improved vision.

Then follows tables showing condition of the eyes of a number of operated cases five to fifteen years after operation. The author does not think the operative treatment of high myopia tends to counteract the tendency of the long axis of the eyeball to increase. N. M. B.

Education of Ophthalmic Surgeons.

Fergus, Freeland (*Ophthalmic Review*, January, 1916), if forming a curriculum for ophthalmic surgeons, would insist upon every ophthalmic student, as a preliminary education, having a good working knowledge of plane trigonometry to the solution of triangles and logarithmic arithmetic, as without this he will not be able to study angles of squint and deviations. He should also know the use of rectangular coordinates, also polar coordinates, for their help in perimetric tracings. It is desirable, although perhaps not necessary, that a student should know the elements of differential calculus. So much for preliminary education.

Regarding professional education, no man should be allowed to begin ophthalmic practice without a medical qualification; and, further, ought to know the technic of modern surgery. Other subjects which the ophthalmic student should be familiar with are anatomy, histology, physiology, physics, geometry and physical optics. He should have a working acquaintance with the spectrometer, the spectroscope, and the optical bench, and be familiar with the calculating of indices of refraction—also a good working knowledge of bacteriology. Extensive knowledge of pathology is not deemed so essential—that given the average medical student probably is sufficient. In addition, the student should be made to attend some advanced lectures, and for at least two years attend an ophthalmic clinic conducted by a man who is himself fairly conversant with the modern scientific side of ophthalmology, where there should be an abundance of clinical material; moreover, some parts of the modern subject of experimental psychology should undoubtedly be studied in an ophthalmic course. The training necessary for an ophthalmic specialist ought to last for about three years, and the names of those who have taken the special course should be placed on special register. N. M. B.

A Corneal Spatula for Removal of Deep Lying Foreign Bodies in the Cornea.

USHER, C. H. (*Ophthalmic Review*, January, 1916). The spatula consists of a blade, a neck and a handle. The blade is circular with a diameter of six millimeters; its anterior surface is convex with a curvature corresponding to that of the posterior surface of the cornea, which with a radius of curvature of 6.8 millimeters, gives a maximum thickness to the blade of nearly one millimeter, its posterior surface is flat, its blunt end smooth. The neck, two millimeters in length, is added so that without increasing the diameter of the blade the instrument can be used for foreign bodies at the center of the cornea. The handle is set at an angle of one hundred and twenty-five degrees with the neck and blade to be conveniently introduced at the nasal edge of the cornea when necessary.

He has used the instrument so far on only two cases. In each the blade was readily introduced through an incision made with an ordinary keratome at the corneal margin. There was no difficulty or complication with either case, the foreign body being removed with a Beer's knife. In the second case the foreign body, which had been difficult to see, became well defined against the light metal behind the cornea. For light colored bodies a dark blade has been substituted and should be of advantage. Possibly a smaller blade would serve as well, but would require a longer neck when used at the center of the cornea.

The advantages claimed for the instrument are that it is more likely to prevent a foreign body entering the anterior chamber during the manipulations for its extraction from the cornea and, as the blade is blunt, it is less liable to cause damage, especially when aqueous has escaped, during any movement of the eye in a restless patient, than a blade with a sharp point and edges, thus giving the operator more freedom to concentrate his attention on the actual removal of the foreign body. The instrument is obviously not suited for the removal of foreign bodies projecting into the anterior chamber.

N. M. B.

The Classification of the Color Blind.

Edridge-Green, F. W. (*Ophthalmic Review*, January, 1916), states the classification of color blindness which he suggests is based upon the new facts of color blindness established upon the theory of vision and color vision which he has advanced, a résumé of which is given. It is maintained that color blindness is only an example of defective development, there being various degrees of color perception corresponding to every stage in the process of the evolution of the color sense.

In order to ascertain the exact color perception of an individual, it is necessary to examine him with a spectrometer which will isolate any portion of the spectrum between two desired wave lengths.

Cases of color blindness may be divided into two classes, which are quite separate and distinct from each other, though both may be present in the same person. In the first class there is light as well as color loss. In the second class the perception of light is the same as the normal sighted, but there is a defect in the perception of color. In the first class certain rays are either not perceived at all or very imperfectly. Color blind individuals belonging to the second class can be arranged in a series. At one end of the series are the normal sighted and at the other totally color blind, and are classified as hexa-, penta-, tetra-, tri-, and dichromatic. There are many degrees included in the dichromic class. The neutral region varies in size, being widest in those cases approaching most nearly to total color blindness.

Shortening of the red end or violet end of the spectrum is a defect distinct from defective color discrimination.

It is universally recognized that many of those who are partially color blind will make matches similar to the normal at one luminosity. A man will pass the Holmgren test with ease and yet confuse the red and green lights of a lantern.

A recent criticism of the author's classification is in the form of an objection because there are so many varieties of one type of color blindness, to which reply is made as follows, i. e.: It would be just as sensible to object to the classification of potatoes, men or dogs as such, because there are so many varieties of each, or even because there is a difference in size. A dog is still a dog whether he be a brown dog or a white dog, a big dog or a small dog, a pug dog or a sheep dog.

In the classification given, the name indicates the characteristic which applies to every member of the class: for instance, every dichromic has only two color sensations, and when examined with a bright spectrum says that he sees only two colors and a neutral region. Shortening of one or other end of the spectrum, alterations in the luminosity, curve or size of the neutral region, whilst producing different varieties, do not affect the fundamental distinctions on which the classification is made.

N. M. B.

The Application of the Wassermann Reaction and the Luetin Test in Ophthalmic Practice

Mackie, T. J., and Manson, W. H. (*Ophthalmic Review,* December, 1916). It may be taken that a positive Wassermann reaction elicited by a reliable method is valid evidence of the presence of syphilis. The negative result is of less definite significance, for in the tertiary and latent stages of the disease only seventy-five per cent and fifty per cent, respectively, of cases yield a positive reaction. This limitation has, therefore, to be carefully considered in any systematic application of the method.

In ophthalmic practice the great prevalence of the syphilitic basis has long been recognized by clinical observation. As a result of certain investigations on a large number of unselected cases, Manson, Mackie and Smith showed that, excluding such conditions as ocular injuries, conjunctivitis, cataract, and the ordinary errors of refraction, about fifty per cent of cases of all other ocular affections collectively were associated with positive Wassermann reactions.

A table shows the record of two hundred and fifty cases representing twenty-nine various ocular conditions, in which one hundred and twenty-five positive reactions were found—one hundred and twenty-two negative and three doubtful.

The cases recorded in the table were not in any way selected from the two following considerations: (1) Where syphilis is one of the known etiologic factors: thus a series of unselected cases of interstitial keratitis, episcleritis, scleritis, sclerokeratitis, iritis, iridocyclitis, choroidal atrophy, optic neuritis, retinitis, ocular palsies, were examined irrespective of the presence or absence of other symptoms; (2) where no definite etiology is known. Since many of these lesions occurred in the later stages of the disease, or at a period of apparent latency, it was further concluded that this statement of prevalence was in all probability an underestimate.

In view of this, they first applied the luetin test to certain of those cases examined in our original investigation (Table 1) that yielded a negative Wassermann reaction. The object aimed at was to detect the cases of late syphilis which failed to react to the Wassermann test. The luetin test was also used in certain cases where marked positive Wassermann reactions had been obtained.

In thirty-five cases when the Wassermann reaction was negative, nineteen positive luetin reactions were obtained; and two cases with doubtful or weakly positive Wassermann reactions were also definitely positive to the luetin test. Of thirteen cases with positive Wassermann reactions, nine yielded negative luetin reactions.

From these results they are convinced that the luetin reaction represents a characteristic and definite cutaneous reaction to the products of the spirochete pallida. The specificity of the test, moreover, has been well established by various workers. It is, therefore, apparent from their results that the systematic application of the Wassermann and luetin reactions together is likely to be productive of much interesting and valuable information in any branch of practice where syphilis is prevalent. It has been shown that the luetin test alone may be of little significance unless positive, and the same applies in some degree to the serum test. On the other hand, these results demonstrate the value of the luetin reaction as a supplementary test to the Wassermann reaction, since in that class of case where the serum reaction is frequently negative, the cutaneous test is likely to yield a definitely positive result. N. M. B.

Malaria and Fundus Changes.

Fergus, Freeland (*Ophthalmic Review,* February and March, 1916), remarks that malaria can cause pathologic conditions of the various structures of the eyeball, and describes in detail the fundus changes in two malarial subjects.

N. M B.

Eye Specula—Three New Designs.

Ewing, A. E. (*The American Journal of Ophthalmology,* February, 1916), goes into the history of eye specula and lid elevation, showing by plates the various designs, from the earliest to the most recent. He argues that the great number of such instruments is evidence that none is perfectly satisfactory. He has devised three specula: one design growing out of the one previous, and finds the second and third very satisfactory. The last instrument is a combination of the spring and friction type. E. C. E.

The Socalled Primary Tuberculosis of the Conjunctiva, and the Conjunctival Tuberculosis of Lupus Patients.

Lundsgaard, K. K. K. (*The American Journal of Ophthalmology,* February, 1916), examined and treated forty-eight cases of conjunctival tuberculosis. Of these forty-eight cases, nineteen had no lupus of the skin, and twenty-nine had lupus.

The first nineteen cases were all under twenty years old; most of them females; all of them were unilateral. The lymph glands were involved in all cases, and suppurated in many of them, and the upper lid was more often involved than the lower.

The conjunctival tuberculosis in the lupus patients occurred between the ages of six and fifty-two years; most frequent between twenty-six and thirty years; more females than males affected. Both eyes were affected in many cases, and the upper lid was more often affected than the lower. The lymph glands never suppurated, and it is doubtful if they were swollen.

The subjective symptoms of this disease are mild—a little swelling and a very little secretion. The mucous membrane shows coarse granulations and frequently scars. In the primary form a swelling of the preauricular gland is often the first symptom noticed.

Considering the above difference in the two classes of cases, Dr. Lundsgaard rather leans to the belief that the first class is of endogenous origin and the second class of ectogenous origin.

The prognosis is favorable when Fuisen's treatment is used.

E. C. E.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

FRANK C. TODD, M. D.,

MINNEAPOLIS.

J. W. CHARLES, M. D.,

ST. LOUIS.

MAX W. JACOBS, M. D.,

ST. LOUIS.

HARRY S. GRADLE, M. D.,

CHICAGO.

HANS BARKAN, M. D.,

SAN FRANCISCO.

Trachoma in the Schools of Jerusalem.

TICO (*Zeitsch. f. Augenh.*, November, 1914). With the assistance of two other physicians and of nurses, Tico has treated 4,525 cases—or 1,200 cases daily. He found only nine cases of pannus. The disease is endemic and found in early youth, even in infants. The higher classes contained the most cases, but the fresh infections occurred most frequently in the younger classes, while the cicatrizing cases predominated in the higher. About thirty per cent of the Jewish population have trachoma, while eighty per cent has been computed among the Arabian. J. W. C.

Treatment of Corneal Fistula.

KUHNT, H. (*Zeitsch. f. Augenh.*, December, 1914), calls attention to his use of the conjunctival flap, and says: "Every rational treatment demands a rapid closure of the fistulous opening."

In peripheral fistulæ, after removal of the bluish white conjunctival vesicle, he cauterized the upper half or two-thirds of the channel, or curetted it thoroughly, and then closed it as tightly as possible with conjunctiva, which was pushed into the opening with a sound and held firmly in place several minutes. This conjunctival flap may be single or double pedicled. The pedicle of the single flap is laid in the upper half of the eye so that it is covered by the tarsal portion of the upper lid, and thus pressed upon the cornea. The double pedicles are placed obliquely or exactly opposite, and fixed laterally with silk. A horizontal position is to be avoided on account of displacements by movements of the globe. In order to temporarily lower intraocular pressure, he often makes a paracentesis opposite the fistula.

When the fistula is three millimeters or more from the limbus, and the anterior chamber is intact, he introduces through a five millimeter keratome incision a spoon behind the inner opening of the canal, for the protection of the iris and lens during the curettement of the channel.

He has also employed the conjunctiva in large central ulcers about to perforate, as well as after perforation.

If the chamber is obliterated he uses a small Graefe, as described in the *Zeitsch. f. Augenh.*, Bd. X, p. 234.

In peripheral fistulæ he uses miotics; in the central ones, mydriatics. Healing takes place in seven or eight days.

In eleven peripheral and eight central cases he had sixteen immediate successes, while three had to be repeated.

J. W. C.

Anatomic Examination of a Case of Cilium in the Anterior Chamber.

Kirsch, Robert (*Zeitsch. f. Augenh.*, December, 1914), reports the case of a smith's apprentice whose left eye had been struck, eight days before admission, by a piece of chisel. Fluid had escaped and the vision had been lost immediately—very little pain afterward. There was no visible wound in the cornea or sclera; there were punctations on the membrane of Descemet, slight hypopyon, iris hyperemic, with an exudate in the nasal sphincter region. The pupil was small and drawn to the inner side, occluded by a yellow exudate. Vision, light perception. Projection prompt. A cilium, partly covered by fibrin, lay upon the iris. A sliver of iron was removed from the nasal portion of the pupil by means of the giant and hand magnets, the cilium remaining. Treatment consisted of inunctions, atropin and bandage.

The inflammation continuing, enucleation followed twenty-five days after the accident. In the serial sections the cilium seemed to lie sometimes within the tissue of the iris, sometimes on its surface, and sometimes free in the anterior chamber.

Immediately upon the cilium lay foreign body giant cells, large irregular protoplasmic masses which closely surrounded it, with numerous irregularly placed nuclei. In the immediate neighborhood there were larger and smaller groups of large round cells, with relatively small nuclei (granulation cells from the iris), some of them containing pigment. There were no visible changes in the structure of the cilium.

J. W. C.

An Improvised Giant Magnet.

Isakowitz (From the West Front. *Muench. med. Woch.*, April 11, 1916). An improvised giant magnet for field work from an abandoned French dynamo. H. S. G.

A Simple Apparatus to Remove Foreign Bodies From the Cornea.

Richter (*Muench. med. Woch.*, April 11, 1916). A horse hair loop is fastened to the end of a rod. The loop is kept sterile by constant immersion in a formalin solution.

H. S. G.

A New Light Hearing Apparatus for the War Blind.

Lazarus, P. (*Deut. med. Woch.*, March 16, 1916). A selenium cell introduced into the circuit of an induced current changes the resistance upon being illuminated sufficiently so that the change becomes audible in a telephone receiver attached to the circuit. By this apparatus a patient proved to the society that the intensity and direction of a light of only moderate strength can be demonstrated accurately. H. S. G.

Specific Therapy of Ulcus Serpens Corneæ.

Augstein, A. (*Muench. med. Woch.*, April 11, 1916). The general practitioner cannot follow all of the details of modern ophthalmology, but should be informed of the important recent advances, such as the advent of optochin. By means of this drug the author claims that every eye affected with a serpiginous ulcer can be saved. The general clinical picture was hastily given, and emphasis laid upon the early and complete microscopic diagnosis. As we possess specifics in zinc sulphate and optochin against the majority of corneal ulcers, we should be able to save every eye thus affected. H. S. G.

Optochin Amaurosis.

Feilchenfeld, W. (*Deut. med. Woch.*, March, 16, 1916). Five grams of optochin were given to a twenty-year-old pneumonia patient, in hourly doses of 0.2 grams each. Within two days poor hearing developed, and on the next day there was a decrease in vision. Complete blindness set in on the subsequent day. The pupils were found to be dilated ad maximum. The fundi were normal except for a narrowing of the vessels on the disc. Sodium iodid was given in large doses, as well as tincture of strophanthus. Under this treatment there was a gradual recovery, first of the hearing, and eventually of the sight. Two months later the corrected vision was 6/6, although there was a concentric contraction of the visual fields and large paracentral scotomata. Hemeralopia and "Flimmer" scotoma gave the patient a great deal of subjective annoyance. The ophthalmoscope showed a bilateral optic atrophy.

H. S. G.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

M. W. Frederick, M. D.,

SAN FRANCISCO.

Jesse S. Wyler, M. D.,

CINCINNATI.

Hemianopsia After Battle Wounds.

Terrien, F., and Vinsonneau (Hémianopsie par blessures de guerre, *Arch. d'Ophtalmologie,* November-December, 1915, Vol. XXXIV, No. 13, p. 785). To the sixty-five cases of hemianopsia resulting from injuries by firearms to the occipital region, collected by Barbazan in his thesis in 1914, the authors have added three cases observed during the war. The cases reported by Barbazan were observed during the war of Secession, the Russo-Japanese war, and the war in Morocco. Three other cases, noted by Cantonnet during the present war, are also referred to, and Cantonnet's remark is cited: "These troubles will be encountered very often during this war on account of the great penetrating power of the modern projectiles, the short distance between the trenches, and because of the head being almost the only part of the body exposed." Amongst ten thousand and twenty-four cases seen at the Ophthalmologic Center of the Ninth Region there were only three cases of hemianopsia from injury to the cuneus. Other observers saw forty cases, which will be reported later on. In the authors' three cases there was immediate loss of consciousness, lasting from two to twelve days, with very little or no vision after the return of consciousness. Vision returned slowly after trephining. The patients turned the head toward the defect in the visual field, and when they walked, or tried to walk, straight, they all circled toward the defective side of the field of vision. The examination of the fundus revealed nothing pathologic, but the pupillary reactions of the side opposite to the cranial lesion, although present, were somewhat diminished.

The three cases of the authors were all cases of right-sided hemianopsia, and in all three there was marked diminution of vision in the right eye from 1/10 to 1/60, the vision of left being 6/10 to 7/10. In eleven cases of Barbazan the same relation was observed; but in twenty-one cases the vision was the same in both eyes. In thirty-three of Barbazan's cases death ensued too soon to allow any accurate findings to be made. In two cases of Cantonnet the vision was the same in both eyes, and undetermined in the third one.

To explain this difference the authors suggest that one might accept a difference in dignity between the crossed and straight bundles of the macular fibers; but the differences in the findings preclude this. The second hypothesis, that of a cortical blindness, does not hold, because no alexia was present. The third hypothesis, that of a hematoma of the opposite cortical center having destroyed or compressed the macular center, seems the most acceptable, and accords best with the concentric constriction of the visual field coincident with the hemianopsia, which almost always accompanies hemianopsia of cortical origin; but it does not explain the variations in vision between the two eyes, and it does not fit in well with the theory of symmetric decussation of the macular bundles and the regular distribution of the fibers in the macular regions.

As to the therapy in these cases, the first thing to try is lumbar puncture. The uses of this procedure are threefold: to relieve the hypertension, to encourage the resorption of blood and clots, and to avoid the deleterious effect of the blood and pressure on the cuneus.

If lumbar puncture does not bring prompt relief the trephine should be resorted to. M. W. F.

Traumatic Rupture of the Ciliary Arteries.

HUGUENIN (Rupture traumatique des artères ciliares, *La Clinique d'Ophtalm.*, February, 1916, from the eye clinic of the University of Berne). Since Siegrest published the first case in 1875, only five others have been reported: two by Birkhauser, and three by Hirsch, and now this author brings forth two new ones. The first patient had been struck in the eye with a stone, causing moderate swelling and redness of the lids, a subconjunctival hemorrhage on the nasal side, discoloration of the cornea with fluorescein in the nasal quadrant. No traces of a tear or other damage. Later an ophthalmoscopic examination revealed a macular hole surrounded by yellowish spots and the whole area covered with blood. Injections of NaCl solution did not improve the vision to any extent.

Second patient, girl of sixteen years, also injured by a stone. Swelling disappeared, but the ecchymosis persisted. Sight was poor immediately following the accident. As no improvement in vision was noted, she came to the clinic four months after the injury. The fundus showed a normal disc, but on the temporal side extending toward the macula was a spot resembling a geographic map, about two discs in diameter, with well-marked edges, yellowish in color and covered with small pigment granules.

A short description of the other cases is given. All were produced by blunt trauma without external damage to the globe, no lasting pain, but immediate diminution of vision. The ophthalmoscopic findings gave a sharply outlined area, resembling a map, in the vicinity of the disc, yellowish in color, and later showing fine pigment granules.

These same symptoms were produced by Wagenmann in cutting a ciliary artery in a rabbit. Whenever a hemorrhage following a mild injury is in the neighborhood of the disc, it probably comes from a ruptured ciliary artery, as ordinarily in vascular diseases a blow will produce peripheric bleeding. The article has the fundi illustrated. J. S. W.

War Injuries to the Deep Membranes of the Eye With Intact Globe.

Rollet and Mangini (Lésions des membranes profondes de l'œil par blessure de guerré avec intégrité du globe, *La Clinique d'Ophtalm.*, February, 1916) find that thirteen per cent of wounds are of the face, and of these a great proportion strike the eye. The authors' attention was directed to many cases with intact bulbs and greatly lowered visual acuity, the true cause being discovered only with the ophthalmoscope. These comprise six per cent of the eye cases examined. Four large varieties with subdivisions are made, and sketches of many of the cases are shown.

1. Detachment of the retina. The simple form, depending on the amount of the area detached. The combined, having a rupture of the choroid. The detachment associated with tears in the retinal issue.

2. Reapplied detachment, with proliferation of connective tissue. These are also of the simple or combined varieties.

3. Rupture of the choroid.

4. Retinochoroidal hemorrhages, with their subsequent lesions.

These injuries are explained by the theory of transmitted force (par contre-coup), the contusion not being directly upon the eye, but upon the neighboring osseous structures, and this in turn is transmitted to the elastic coats of the bulb, which remain uninjured, but the delicate inelastic membranes bear the brunt of the shock. The therapy is excellent. J. S. W.

Concerning Secondary Glaucoma.

Abadie (Du glaucome secondaire, *La Clinique d'Ophtalm.*, February, 1916) claims that secondary glaucoma is much more frequent than suspected, and many cases of blindness are due to faulty diagnosis. The recognition is easy when accompanied by inflammatory symptoms of the anterior segment, but very difficult, when all signs are upon the part of the deep structures, to determine its secondary character. Chorioretinitic patches in the periphery should be searched for, as the therapy is different from that of a primary glaucoma. Unless the exciting cause is treated, operation alone will not save the eye, and in a certain percentage of cases treatment without surgical intervention is sufficient. The proof of this is shown in hydrophthalmus, which is always a secondary glaucoma of infancy, assuming its pathologic aspect, because of the elasticity of the sclerotics. All operations have proven useless, so Abadie has for years refused to treat any of these cases surgically and uses mercury intravenously or intramuscularly, and in very young infants by means of inunctions. By this means he effects cures while surgery fails to benefit. J. S. W.

Prophylaxis of Wounds of the Globe.

Terrien, M. F., and Cousin, M. G. (Prophylaxie des blessures du globe oculaire, *Arch. d'Ophtalm.*, Vol. XXXIV, November-December, 1916, p. 811). The war wounds of the ocular globe can be divided into two classes. In the first, the wound is due to a large mass of metal, such as a bullet, a large fragment of shell, or rock. In such cases, unless the impact of the foreign body is so tangential that a mere erosion of the cornea results, the injury to the eye and its osseous surrounding, and to the brain, is such that the eye is at once lost, and life often also.

The second class concerns the smaller fragments of metal and stone which reach the eye with enough momentum to penetrate, but not sufficient to destroy the eye. In five hundred and sixty-one cases of this class there was injury of the bone in five cases only. The eye itself, however, was badly damaged, and the vision reduced to nothing or simple perception of light in sixty per cent of the cases. One hundred and forty-two cases had vision of more than 5/10. Enucleation was done in one hundred and twenty-two cases, showing the intolerance of the eye toward intraocular foreign bodies.

The number of injuries of the first class was one hundred and forty-one, or about twenty per cent of all cases, a proportion which is maintained in the reports from the other ophthalmologic centers. A striking feature in these cases is the absence of wounds of other parts of the face, or, rather, the unimportance of such wounds; if they had existed, the soldiers had forgotten the slight lesions caused by these minute fragments. The nobility of the eye makes its impairment so much more grave than the slight skin defects and scars in other parts of the face. This led the authors to seek some means of preventing this class of eye injuries. For some time the soldiers have been wearing masks which protected them from asphyxiating and tear-producing gases. Using a new model of automobile glasses as a starting point, the authors have devised a pair of goggles the front of which is a semiellipse of metal one millimeter thick, and large enough to rest on the orbital margins. In this there are several slits and minute holes, and the inner surface is lined with a thin sheet of mica. The rim is of rubber, and the whole is fastened to the head with elastic bands provided with hook and eye in the back. The slits act as stenopeic slits and improve the vision of ametropes noticeably. Besides, the correcting lenses can be worn behind the protecting device. Thus the soldiers are protected against all small particles excepting those which strike perpendicularly and exactly in the slits. Against the criticism that large fragments and bullets would carry splinters of metal from the goggles into the eye, the authors reply that a missile that would do that would destroy the eye anyway.

The goggles are to be pushed up on the forehead or down over the mouth except when the soldiers are exposed to fire. Another advantage claimed is that the sheet of mica will protect the correcting lenses from moisture, which has been a source of much trouble to the men in the trenches wearing glasses. M. W. F.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

William H. Crisp, M. D., Oph. D. (Colo.),

Denver.

The Prognosis in Sarcomas of the Choroid.

Arganaraz, Raul, Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires*, third year, p. 9). The paper is based on thirty cases. In six of these enucleation was done late. In two of these cases the tumor had already recurred, and in the other four it had perforated the eyeball.

In only two cases was the operation done in the first stage of the disease, before the development of glaucomatous symptoms. Fourteen patients were operated upon in the second stage of the disease, and after intervals varying from six months to two years from the first evidence of the presence of the tumor. Fourteen of the patients died from internal metastasis.

Etiology and Pathogenesis of Sarcoma of the Choroid.

Arganaraz, Raul, Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires*, third year, p. 19). As regards the traumatic factor in sarcoma of the choroid, only three out of eighteen patients who were questioned in this respect gave a record of having received a traumatism some time before the appearance of the sarcoma. The time which had elapsed between the traumatism and the appearance of the neoplasm varied between six and twenty months. In view of the great frequency with which traumatism of the eye is encountered, the occurrence of traumatism in these cases may be regarded as a simple coincidence; or occasionally may have merely accentuated the growth of the neoplasm.

In the course of histologic study of sections of normal eyes, Arganaraz encountered a minute pigmented nodule, measuring one-fourth by one-sixth of a millimeter. This "fetal neoplastic germ" is depicted in an excellent illustration.

The Specific Treatment of Pneumococcic Infection of the Human Eye With Hydrochlorid of Ethylhydrocuprein.

ARGANARAZ, RAUL, AND REBAY, HECTOR, Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, p. 29). A description is given of the clinical course of nine cases of hypopyon ulcer of the cornea. The following conclusions are reached: Conjunctival instillation of a one per cent solution of optochin, used every hour, constitutes at present the treatment of election for combating pneumococcic infection of the cornea. Cultures of pneumococcus in agar and serum do not develop under the action of optochin in a solution of 1:600,000. The culture is killed by a solution of 1:100,000. The action of optochin is elective for the pneumococcus, and the drug has no action in vitro on cultures of the staphylococcus and streptococcus. The necessity for frequent repetition of the instillations of optochin in hypopyon ulcer of pneumococcic origin apparently indicates that the formation of antibodies is almost or entirely absent. The bactericidal action of optochin allows of prophylactic treatment of pneumococcic infection in surgical practice.

Symmetric Lymphomata of Both Conjunctivas—Treatment With Radium.

DEMARIA, ENRIQUE C., Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, p. 44). The first case was in a woman of thirty years. The condition had been noted for one year. In each superior cul-de-sac was a grayish red mass which elevated the conjunctiva and the upper lids. The patient suffered no inconvenience. The masses were extirpated, and were found not to possess capsules. The patient came back a year later with growths larger than the previous ones, and involving the inferior cul-de-sac. She was now incapacitated for work by lacrimation and other signs of irritation. Further operation was refused and the patient was lost sight of. Microscopic examination of the original growths showed the classic structure of lymphoma—that is, a delicate reticulum containing within its meshes rounded lymphocytes, with little protoplasm and large nuclei staining well with hematoxylin.

The second case was in a woman of forty years, whose history in this respect also dated back for one year. Both upper lids had an appearance of edema, and the culs-de-sac showed soft reddish masses, approached in the left eye by some small transparent vesicles, corresponding to dilated lymphatic vessels, the rest of the conjunctiva being absolutely normal. Complete cures resulted from the application, at intervals of three or four days, and extending over a total period of two months, of a dose of ten milligrams of bromid of radium, the duration of each application varying from fifteen to forty minutes. After the third application there was a congestive reaction, which continued to the fifth application, after which the tumor commenced to diminish in size.

Extraneous Formation of Bone in the Optic Disc.

Demaria, Enrique C., Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, p. 49). The eye was of the familiar atrophic, painful type, and had been removed from a woman of seventy years. The microscopic findings were those usually occurring with chronic iridocyclitis with subsequent atrophy and ossification. The bony tissue replacing the choroid, instead of terminating in a bony ring in the vicinity of the optic disc, extended as a ring into the structure of the disc itself. The bony structure was completely typical, containing a moderate quantity of medulla, Haversian canals, and osteoblasts.

Sympathetic Choroiditis.

Demaria, Enrique C., and Ferro, Publio B., Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, p. 53). The left eye of the patient, a girl of fourteen years, received a deep injury. This eye was enucleated after the appearance of sympathetic iridocyclochoroiditis in the other eye. The disturbances in the anterior segment of the second eye rapidly disappeared under treatment, which included internal administration of mercury, but the inflammation of the choroid increased. The arteries were normal, but the veins were large and somewhat tortuous. The disc was surrounded by a dark halo, extending in two bands towards the macula. In the equator of the fundus and in the vicinity of the venous branches were numerous grayish pigmentations, reddish or blackish. A few months later the choroidal lesions had extended toward the periphery. The condition is well illustrated with a colored drawing. The patient gave a mild positive reaction to the Wassermann test. She was discharged after eight months with vision of one-half.

Vaccinotherapy of Trachoma.

DEMARIA, E. C., MAZZA, S., AND REBAY, H., Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, p. 68). In two tubes containing two cubic centimeters of sterile physiologic solution and a number of glass pearls are placed as large a number as possible of trachomatous follicles extirpated by superficial and deep curettement of the conjunctiva. This mixture is agitated for one hour, the pearls mechanically triturating the follicles. Sulphuric ether is added in quantity equal to that of the physiologic solution, the resulting mixture being agitated for twenty-four hours. The sterility of the mixture being tested by cultures on agar, the ether is evaporated, the remaining liquid is diluted ten times and filtered through sterile paper, and is placed in sterile sealed ampoules. A dose of one cubic centimeter of this preparation, either as an autogenous or heterogenous vaccin, was injected subconjunctivally. The result was a slight reddening of the palpebral conjunctiva and a flattening of the granulations. The redness disappeared in a short time and the flattening of the granulations increased. Twenty cases were thus treated, most of them having a marked pannus and ulcers of the cornea. The number of injections administered varied from three to seven, always at intervals of one week. In the majority of the cases a marked improvement resulted from the treatment.

Mikulicz's Disease.

FERRO, PUBLIO B., Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, p. 76). The patient was a woman of forty-four years. The history was negative with the exception that the patient was said to have had rheumatism for three years. For three years there had been swellings of both upper lids and on both sides of the face. The swellings in the eyelids corresponded to the position of the lacrimal glands, and the facial swellings were over the masseter muscles. The sublingual glands were normal, as were the teeth, pharynx, tonsils, nose, and ears.

Action of Calcium in Glaucoma.

GOWLAND, ALEJANDRO, Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, p. 88). In each of five cases described, two cubic centimeters of a five per cent solution of chlorid of calcium were injected, usually in the gluteal region. The results were lowering of the ocular tension and relief from pain, usually occurring after two or three hours from the time of the injection.

Cataract From Electric Discharge.

GOWLAND, ALEJANDRO, Buenos Aires (*Boletin de la Sociedad de Oftalmologia de Buenos Aires,* third year, page 93). Two cases are described. The first patient was struck by lightning. There was a superficial swelling of the face. Disturbance of vision of the right eye began two or three days after the traumatism. The vision of the left eye began to diminish about eight months later. The opacity was in the posterior cortex. One year after the accident the right eye had vision of 1/2, and the left eye equal to counting fingers at three meters. In the second case the patient received a discharge of high tension electric current (13,500 volts). He was knocked senseless. Six weeks after the accident the vision of the right eye began to become cloudy, and a similar disturbance began in the left eye three months after the accident. Each eye had vision of 1/2 six months after the accident. The opacity was principally in the cortical region.

ABSTRACTS FROM SCANDINAVIAN OPHTHALMIC LITERATURE.

BY

WILLIAM H. CRISP, M. D., OPH. D. (COLO.),

DENVER.

A New Selfregistering Perimeter.

SCHIÖTZ, HJ., Christiania (*Norsk Magazin for Laegevidenskaben,* September, 1915). This new apparatus is similar to the one proposed by the author in 1885. In the new perimeter the chart is in a fixed position, and the recording apparatus movable, whereas in the earlier perimeter the reverse was the case, so that the chart was liable to become misplaced. The most importance difference between the two perimeters is that the arc is now made with a radius of thirty-three centimeters, instead of twenty-five centimeters, as formerly; that the width of the arc is six centimeters as against two centimeters; and that the central disc to which the arc is attached now measures twenty centimeters in diameter, as against ten centimeters formerly. The test objects are one, two, three, five and ten millimeters in diameter, and are secured at the end of a thin stiff, black metal rod.

Melanosarcoma in the Eye.

HAGEN, SIGURD, Christiania (*Norsk Magazin for Laegevidenskaben,* March, 1916). This is a comprehensive survey of the whole subject, with particular reference to cases observed in the Royal Hospital in Christiania. It has been generally stated as a point in differential diagnosis that in serous detachment of the retina the intraocular tension is diminished, while in the first stage of intraocular tumor the tension is normal. This is not borne out by the experience of the Christiania clinic, where in six cases diagnosed in the first stage the tension, as measured with the Schiötz tonometer, was, respectively, twenty-one, twenty-three, eighteen, eighteen, eighteen, and fourteen millimeters of mercury. As regards the duration of the disease, so far as indicated by the symptoms, the six patients who were seen in the first stage recorded symptoms as having existed for three months, nine months, two years, eight days, three months, and six weeks respectively. In the case in which symptoms had only developed eight days before the patient was seen, the tumor was already fairly large and must, therefore, have existed for a relatively long period, the absence of symptoms being attributable to the peripheral location of the growth. In two cases only one year or less, and in no case more than two years, elapsed between the first occurrence of symptoms and the onset of the glaucomatous stage. The second stage does not usually exceed one year.

As regards the total duration of the disease, of nine patients who certainly developed metastasis, in three the total period elapsing from the onset of the first stage until death was about three years; in three cases about four years; in two cases about six years; and in one case about eight years.

Of the twenty-eight patients who were operated upon in the eye clinic for sarcoma of the choroid, twenty-four were observed for at least three and a half years. Of these, at the time of writing, twelve were living and well; two had died, apparently from another cause, after respective periods of twelve and twelve and a half years; and two had developed metastasis or recurrence; representing fifty-eight per cent of cures. The percentage of cures stated by a number of other authors has varied from six to fifty-six; the wide range of difference depending upon a lack of uniformity in classification. There is a general agreement that, as would be expected, the prognosis is much better in those cases which are operated upon at an early stage.

In the Christiania clinic recurrences were only encountered among patients who were operated upon in the third stage—that is, after the tumor had broken through the ocular coats—being met with in three out of seven such cases. Metastasis occurred, as a rule, in the first four years after operation, the period varying, in eight cases, from two years and five months to six years. If a period of four years has elapsed after operation, regardless of the stage at which the operation was performed, and there is no sign of metastasis or recurrence, the patient may with a fair amount of certainty be regarded as cured; although Hirschberg has reported a case in which a patient operated upon in the first stage died of metastasis in the liver and heart nine years later. The danger of recurrence appears to be greatest within six months after operation.

From the material of the Christiania clinic, Hagen concludes that the degree of intensity of pigmentation of the tumor has no significance as regards prognosis.

Clinical histories of thirty-four cases are appended to Hagen's paper. Twenty-eight were cases of sarcoma of the choroid or ciliary body, five of the conjunctiva, and one of the iris.

SOCIETY PROCEEDINGS.

BY

ARTHUR J. BEDELL, M. D.,

ALBANY.

CHICAGO OPTHALMOLOGICAL SOCIETY.

Regular meeting, held February 14, 1916. Dr. William E. Gamble, the president, in the chair.

Conjunctivitis Hypertrophica Plasmocellularis.

Dr. Harry S. Gradle reported a case of conjunctivitis hypertrophica plasmocellularis, and exhibited the patient.

Discussion.—Dr. Francis Lane stated that the sections of the tissue given him by Dr. Gradle were not satisfactory, owing to imperfect paraffin embedding. However, all the layers of the conjunctiva were hypertrophied. The epithelium was thickened and contained numerous goblet cells throughout. Those in the superficial layers of the epithelium were the larger and appeared to have open stomata, as if expelling their contents.

These cells were first described by Stieda a number of years ago, and were increased materially in chronic conditions of the conjunctiva, and have been compared with the cells of the mammary gland in that they are not deformed after expelling their contents. They are true unicellular mucous glands, and it is because of their integrity that the epithelium does not desiccate after the extirpation of the lacrimal glands.

The basement membrane is rather wavy and the subepithelial stratum is infiltrated with both large and small plasmo cells with a certain amount of connective tissue formation, indicating a chronic process.

The socalled fibrous stratum, instead of consisting of dense connective tissue, is markedly infiltrated with small round cells and fewer large fainter staining cells, almost like epithelial cells undergoing degeneration.

In no sense of the word does the microscopic picture resemble trachoma, follicular conjunctivitis, spring catarrh or tuberculosis, but more like lymphoid hypertrophy of both layers of the substantia propria.

Dr. Harry S. Gradle, in closing the discussion, stated that a case, very thoroughly studied, was reported by Elschnig in the *Medicinische Klinik* of 1914. This was an acute case, therein differing from the others, which were of the subacute or chronic type. In Elschnig's case, which was treated for over five months, a cure only followed complete excision of the transitional folds, and a large portion of the tarsal conjunctiva. The blood picture returned to normal shortly after the patient was cured. The preauricular and submaxillary lymphatic glands in this patient were extirpated and found to consist of lymphoid hyperplasia; consequently, Elschnig considered this a local manifestation of a general disease affecting the lymphoid producing structures of the conjunctiva, the infection manifesting itself by swelling of the preauricular and cervical glands, and by a peculiar plasmocellular hypertrophy of the conjunctiva. We cannot take it for granted that a generalized infection is essential here, because the conjunctiva in itself is a part of the hematopoietic system, in that it can produce new lymphocytes; we, therefore, are dealing probably with a localized rather than generalized condition.

The speaker said he would follow the suggestion of Dr. Suker, of massaging with ten per cent ichthyol ointment, because the boy has shown improvement under two per cent solution of ichthyol, before he attempts excision of the transitional folds.

Cyst of the Iris.

Dr. Fred W. Bailey, Cedar Rapids, Iowa: The patient, Miss C., aged sixteen years, was brought with a provisional diagnosis of cyst of the iris following traumatism. She was injured eight years ago by a punctured wound which penetrated the cornea in the upper nasal quadrant for a distance of one-eighth of an inch. She was incapacitated for two weeks at the time, and from that time on she noticed nothing wrong with the eye until last November, when she was husking corn in the field, and one of the men in throwing an ear of corn in the wagon accidentally threw it against her eye and caused pain. She said her sister looked at the eye and noticed a growth in it which almost covered the entire pupil, as she stated.

The patient was seen three weeks after this, at which time there was a growth in the anterior chamber which almost filled the entire pupillary area. After dilating the pupil with homatropin, he noticed there was not only a growth in the anterior chamber, but also one in the posterior chamber a little lower down, toward the nasal side, which was pigmented. Those who saw the case noticed the growth in the anterior chamber as nonpigmented, and absolutely translucent, while the one in the posterior chamber was pigmented.

Dr. Suker called it an autogenous implantation cyst of the iris, caused by proliferation or growth of the iris. But this is monocular, and the anterior cyst seems clear. Some of the flocculent material in the cyst is clear down to the bottom of the cyst, forming a more dense picture. The entire iris can be seen through the cyst. The lens is uninjured except where it is distorted, causing the optic disc and the retina to assume the picture of an astigmatic eye. The vitreous is also clear.

The question is what to do in a case like this. Dr. Suker suggested that the first thing to do would be to aspirate the cyst, and later to do an iridectomy to see whether or not we are right.

Discussion.—Dr. Oscar Dodd recalled a case he had some years ago of punctured wound of the cornea; but in this case there was a traumatic cataract. Within a few months after the removal of the cataract a cyst developed, the man disappeared from view, and returned subsequently because of pain in the eye due to tension. On examination there were multilocular cysts filling over one-half of the anterior chamber. After removing the cyst he made an incision and removed as much of the cyst wall as he could. The eye quieted down and for several years gave no further trouble.

Such cases were not very common. One such case was reported by Weeks before the American Ophthalmological Society, with good drawings of the case, the report having been published in Knapp's Archives.

Classification of the Various Types of Inflammation of the Orbital and Cranial Portions of the Optic Nerve From the Clinical Pathologic Standpoint.

reported in miners, but he has found the same in some cases above title.

Regular meeting, held March 20, 1916. Dr. William E. Gamble, the president, in the chair.

The Value of the Accurate Localization of Foreign Bodies in the Orbit.

Dr. C. C. Clement reported cases and emphasized the following points in recapitulation: Radiographic localization is the only accurate method of localization which we now possess. It is dependable when performed by competent men. It furnishes valuable information in determining whether or not the steel is within the globe. It gives information which we must possess before we can make an intelligent choice of operations for its removal. In case the corneal route is chosen, it modifies the Haab operation in such a way as to lessen the probability of doing violence to the lens. If the scleral route is chosen, it usually eliminates the necessity of introducing the tip of the magnet into the vitreous, an act which should always be avoided if possible. From a medicolegal point of view, it furnishes a positive record of great value.

Discussion.—Dr. Willis O. Nance said that the localization of foreign bodies in the vitreous is one of great practical importance to every ophthalmologist. He asked, as a matter of information, in what percentage of cases met with clinically did the foreign body lodge in the orbit.

Dr. Nance happened to be studying in Europe when the discovery of radiography was made. When he returned to Chicago he had a radiograph taken from the temporal side of a case of foreign body in the eye. It was one of the first of this character taken in Chicago. He reported the case, with a cut of the radiograph, in the Chicago clinic. Since that time he has had many cases of foreign bodies in the eye. He was more and more impressed with the importance of having localizations passed upon by an expert radiographer. During the last few years he has in the main relied upon one radiographer, Dr. Potter, and has found his results very satisfactory.

After locating the foreign body the question is how it should be removed, whether by the scleral route or through the cornea. This depends upon the point of entrance and, to a great extent, upon the size of the foreign body. It is usually a mistake to attempt to draw a large body through the eye. He had found by experience that the ultimate result secured in injuries of this kind depended upon the size of the foreign body. With a large foreign body in the vitreous there is not much chance of getting a very satisfactory result. If the foreign body is small, the prognosis is usually good. He recalled the case of a man from a neighboring state who received a foreign body which passed through the cornea, through the lens and lodged in the vitreous. It was removed by the anterior route, and the patient recovered with 20/20 vision. He saw the man three or four years later, and his vision was still 20/20. There was a very small opacity in the lens.

Referring to the care that one should take in preserving foreign bodies removed from the eye, especially if they are small, Dr. Nance stated that twelve years ago he removed a small foreign body from the vitreous of a man living in an adjoining state. He made a report of the case at this time to the parties who were interested and retained a copy of the record. Two or three months ago he received a letter from an attorney, who was connected with the corporation for which the man worked, calling attention to the fact that the case had not been settled, and wanted to know if Dr. Nance could appear as a witness and, if possible, to bring the foreign body with him as evidence. They quoted from the report which Dr. Nance made at the time, and which he found on record in his office. When he looked for the particular specimen he was unable to find it. He had been in the habit of placing these specimens in small vials in which there was some cotton. He placed the foregin body next to the glass so that it could be readily seen, marked the specimen and put it away. When he opened the drawer that contained quite a number of specimens he found in the vial supposed to contain this particular foreign body only a discoloration of the cotton. Evidently the foreign body through the process of oxidation had quite disappeared. He then looked over other specimens and found one in the same condition. He took out the cotton and instead of finding the foreign body found fine dust. Experience had taught him a better way of preserving these foreign bodies, namely, placing the foreign body on a card and covering it with glue or some other similar substance to protect it from the air.

Dr. John R. Hoffman agreed with Dr. Nance that in cases of foreign bodies of large size in the eye we do not need to pay much attention to their location and method of their removal, because their large size indicates the location and the easiest route of removal. He believes that most small bodies go through the cornea and crystallin lens, which is opaque or beginning to opacify when the patient presents himself.

The great majority of these foreign bodies can be removed through the corneal route by the classic operation of Haab, without further damage to the lens and less injury to the structures in the posterior segment of the eyeball, the magnet here acting as a sideroscope and at the same time as the means of removal of the foreign body.

Occasionally cases present themselves in which there was no response to the giant magnet because of the length of time elapsing between the injury and attempted removal, the foreign body having become encysted or imbedded in some way, making response to magnetism impossible, and those cases are the ones that certainly call for localization.

A few days ago he saw such a case, in which a piece of steel penetrated the eye through the upper border of the cornea through the lens back into the posterior segment somewhere. He tried to remove it through the corneal route, but there was no response to the magnet. He then tried to locate it back of the ciliary body, but there was still no response. The patient was sent to Dr. Wells, who localized the foreign body at about the junction of the posterior and middle third, twenty-one millimeters back of the center of the cornea in the median line, and sent Dr. Hoffman word that if he would cut down on it at that point he would get it. The eye was cocainized, but as a direct line would mean going through the superior rectus muscle, the incision was made about three millimeters to one side and a little anterior to the point of localization, thinking that the magnet surely would pull the steel into the wound. After several applications of the giant and hand magnet the attempt at removal had to be given up.

The patient was again sent to Dr. Wells, who relocated the foreign body forward in the root of the ciliary body and still in the median line. The incision made the day before being within a few millimeters of this location, the tip of the large magnet was inserted under the sclera to the point of location, and the small chip of steel was extracted from the location (last) in which Dr. Wells said it was.

This case shows the value of localization of chips of steel in the eye where the magnet had failed in a previous operation in an injury where the cornea and lens had been penetrated, though the anterior chamber route was clearly indicated. He believes, however, that where the foreign body has entered back of the ciliary body, or when the foreign body had been in the eye for several days or longer, accurate localization should be done so as to indicate the shortest route for its removal.

Dr. George T. Jordan emphasized the value of localization by reporting the following case:

A boilermaker, while at work, had something fly into his eye, causing a severe wound. In less than two hours he saw the patient and by means of the giant magnet pulled a large piece of metal through the wound.

The case pursued the ordinary course and in due time was discharged, having light perception and projection. In about thirteen months the patient suddenly presented himself with a marked sympathetic ophthalmia. The offending eye was immediately removed, with the surprising result that the sympathetic ophthalmia cleared up, which brought about doubt as to its being a true sympathetic ophthalmia.

The patient's general health was most thoroughly investigated by a competent internist, and nothing was found which could cause the trouble.

When the eye which was removed was mounted, blocked and cut into, something was struck with the knife, which was found to be a piece of rust broken off from a large portion of metal removed at the time of injury. This no doubt was the cause of the sympathetic ophthalmia.

Since that time Dr. Jordan has had radiographs taken, both before and after removal of foreign bodies from the eye.

Dr. William A. Fisher exhibited a drawing that Dr. Wells had made for him which showed a large foreign body about one-half inch behind the external coats of the eye, and there was no hope of getting it out. He could not understand how anyone could expect with the magnet placed in front of the eye to draw a foreign body up through the opening in the back part, as the eye would change its position and prevent this foreign body from coming through.

He agreed with Dr. Hoffman that most foreign bodies go through the lens, and if the lens is injured the method of bringing the foreign body through the lens is best.

Some time ago he reported to this society one hundred and fifty cases of foreign bodies in the eye, in which he took the position then that the magnet should be used first, and if one was not able to find the steel, an X-ray should be taken. If the foreign body goes through the lens, the best way to get it out is through the lens. If it does not injure the lens and makes a large opening in the sclera, the proper thing to do is to put the magnet in the large opening and bring the object through the original opening or make the opening larger. In this case he used the magnet, as he always does, before taking a radiograph, because if the foreign body goes through the lens or back of it, he sees every reason for using the magnet before taking a radiograph. In this case the foreign body has passed through the sclera on into the eye and out through the sclera into the tissues, and cannot be removed unless the eye is removed. It is to be hoped the metal will be encapsulated.

Dr. Hal P. Wells discussed the subject from two standpoints —first, the accuracy of present methods of localizing foreign bodies in the eye or orbit, and second, the limitations, if any there be, of the X-ray in discovering certain substances which may be encountered in the arts and industries and which may be gotten into the eye.

The experience of the speaker in bringing him to his present views in these matters has covered a period of fifteen years, and he felt it rather difficult to adequately cover the discussion of even the salient points involved in the short time allotted to him.

Practically the entire range of foreign substances which may be encountered in the orbital cavity are divisible into two main classes. First, the highly opaque metals, including steel, iron, copper, brass, lead, and certain nonmetallic substances and oxids, such as crockery, stone, pyrites, anthracite coal, all of which may be considered practically of a class from the standpoint of opacity to the ray—in fact, they are all easily discovered.

Under the second group are considered less opaque substances, such as certain varieties of glass, aluminum, soft coal, wood, and a few other substances rarely encountered.

Dr. W. M. Sweet of Philadelphia has stated that any substance whose physical properties cause it to cast a shadow under the X-ray may be shown in the eye.

This statement the speaker thought required considerable qualification, for it has been his own experience in working up the subject experimentally that the ability to show certain foreign bodies on a photographic plate depends upon the immediate environment of the substance which it is attempted to show, and not upon the thickness or variety of tissues through which the ray must pass in reaching the sensitized plate; and as illustrative of this physical fact pertaining to the X-ray and certain substances, the speaker mentioned his experimental work with bits of lead free glass—that is, glass containing no lead or metallic oxids which would make them opaque.

In this experiment a very small particle of crown glass was cemented with collodion to the temporal region of a live subject, so that by lying on the plate the eye of the subject came directly in line with the piece of glass and the ray from the focal point of the target of the X-ray tube. Under this condition the particle of glass was easily shown on all plates with varying exposure and varying qualities of the X-ray light used.

The same particle of glass was then embedded in the vitreous of a sheep's eye, which was then placed in the orbital cavity of a skull. Under these conditions the piece of glass cast no shadow on the photographic plate unless the particle of glass was large—that is, measuring at least a millimeter and a half in thickness by several millimeters in breadth and length. Small particles such as used in the first experiment were entirely lost.

The speaker mentioned that most of the glass used in the arts and industries, as well as much of the glass used for optical purposes, contained some ingredient making it possible for even small particles to cast distinct shadows on the dry plate; most of the flint glass used containing lead oxid or barium or some other metallic oxid for the purpose of clearing or whitening the glass, or to give it other desirable physical properties.

However, in spite of the difficulties attending certain of the substances which the speaker included in the second class, he believed that a further refined technic may still further eliminate the very few exceptions to the rule that practically all foreign substances in the eye may be unmistakably demonstrated as to size, number and position. Illustrative of the finer differentiations which the modern technic has made possible, a plate was exhibited showing a very small wooden splinter deeply embedded in the tissues of the hand.

With reference to the use of the giant magnet, the speaker had seen many demonstrations of the unreliability of this instrument, both as a diagnostic and a therapeutic resource. He had seen a number of large pieces of steel in the eye which gave no reaction to the magnet, and one case in which the foreign body consisted of a particle of tool steel about four and a half millimeters in length by three millimeters in breadth and an average of a millimeter in thickness, which was located at the equator of the eyeball, and which had made a large passage on entering the eye, gave no pain reaction whatever when the Haab magnet was applied. This particular case was referred to him with a negative diagnosis as to the presence of a foreign body, both the patient and the surgeon believing the wound in the cornea, iris and lens had been caused by a large body striking the eye and falling away without entering the globe, and the X-ray was resorted to merely as confirmatory of the negative diagnosis made with the magnet.

Dr. Wells then exhibited and demonstrated the Snook-Sweet apparatus for localizing foreign bodies and charting the localization in three dimensions.

He also showed a number of lantern slides and plates illustrative of his discussion.

Dr. C. C. Clement, in replying to the question of the percentage of the foreign bodies found in the orbit, said there was only seven per cent in one series of cases reported. Statistics on this point would probably be inaccurate unless one excluded all the cases that had not been localized by the Sweet method of localization or some other method equally accurate. He does not believe anyone can tell where a piece of steel is located by looking at the plate. Both Dr. Potter and Dr. Wells say they are unable to do so.

As to the choice of method of removing a piece of steel, he quoted Dr. Casey Wood as having written to one hundred and fifty surgeons, eliciting their opinion as to which method they preferred. Of those replying more than one-half preferred the scleral route, and the majority of them were located in the East. Accurate localization was generally practiced in the East before it was in the West, and the fact that eastern men preferred this route was significant.

In reply to Dr. Fisher's question, plates were shown to answer it. It was desirable to know the size of a foreign body before attempting to extract it. One could not tell the size of it by the wound of entrance. The body might be long, round or square. A foreign body could get into the eye through a surprisingly small opening.

Injuries to the Eye From Broken Spectacle and Eyeglass Lenses.

Dr. Frederick B. Vreeland, after reviewing the literature very thoroughly, stated that the most significant conclusions to be drawn from the number of cases reported in the literature are:

1. That in proportion to the entire practice of one hundred and two ophthalmologists, serious injuries to the ocular apparatus from broken lenses were very rare.

2. That rimless spectacles being worn in the greater percentage of injuries reported would indicate them to be less safe than other styles of glasses. This result is attributable to the fact that spectacles occupy a fixed position and the rimless lens is more easily shattered. In the case of nose glasses, which are more easily knocked off the face, the chances of the eye being lacerated are less.

3. In most of the injuries reported the presence of minus lenses is noted. This is doubtless due to the fact that the centers of many minus lenses are not only so thin that they are often punctured by the ordinary force of cleaning, but also because they form a cutting edge, so to speak, with the sharp edges immediately in front of the pupil. The opposite is true of convex lenses, as they afford a rounded surface, a greater degree of thickness of center, and altogether tend to deflect a flying object.

4. That glasses are a protective element rather than a menace is clearly shown by these reports, although the refraction has an important bearing upon that question.

5. It is well recognized that injuries do occur in which the glass no doubt adds to their severity because of its lacerating nature, but it is demonstrated that the advantages of glasses far outweigh this remote risk of added injury, and when you consider the nature of the force that usually causes these accidents, we can be reasonably sure that the eyeball would have suffered severe injury even though the glass had not been present.

6. That the eyeball can be severely injured in the form of trauma with comparatively small loss of function seems to be due to the aseptic properties of the glass.

7. The consensus of opinion that this accident occurs oftener in men than in women is perhaps due to the fact that men are more exposed to this kind of accident in various forms of industry and while taking part in various sports.

8. Some surgeons have expressed the belief that this kind of accident almost always occurs in industrial pursuits; the reports received, however, show that the injury is often a household accident, or a result of athletic games.

Discussion.—Dr. Willis O. Nance stated that in 1907 he reported a case of ocular injury by a broken spectacle lens, and at that time looked up the literature very carefully and was unable to find any cases that had been reported previously. The case was fully reported in the first volume of the *Journal of Ophthalmology and Otolaryngology*. Dr. Worthington also reported a case before the society. The speaker was struck at that time with the rarity of injuries of this kind in clinical experience.

At the eye and ear infirmary, after ten years' experience in seeing many cases of ocular injury in that institution, this was the first case of injury by broken spectacle lens he had ever seen. Since then a number of cases had been reported. The late Dr. Beard had seen two or three such cases since this report was made. The speaker wondered if rimless glasses, both eyeglasses and spectacles, being worn much more commonly in the last eight or ten years, were not responsible for the number of more frequent occurrences of cases of this kind.

Dr. Fred W. Bailey, Cedar Rapids, Iowa, stated that in the last five or six years he had had four cases of injury to the eyeball with broken spectacle lenses. The first occurred about six years ago, the patient being a young girl, eight years of age, whom he refracted and fitted for lenses. She had a slight degree of hyperopia and plus astigmatism. Two weeks afterwards she was brought back to him with the statement that a boy at school broke her glasses with a poker and injured the eye. She had a perforating wound of the cornea; three splinters of glass were taken out of the cornea, an iridectomy was done, and the child got along all right, vision normal, with added astigmatic correction.

The next case was a man, thirty-five years of age, who wore rimless spectacles for a low astigmatism. He was playing squash, the ball broke his glasses, cutting the sclera just outside of the external limbus of one of the eyes. He was sent to the University Hospital to have an X-ray examination made, to see whether or not there was any foreign body in the eye, but there was none. The eye healed and is as good as ever.

The next case was a young Englishman, twenty-five years of age, who, in playing ball, had his rimless spectacles broken by his opponent. He had four diopters of myopia. The broken glass cut the cornea, which was followed by prolapse of the iris. An iridectomy was done, and the man recovered with two-thirds vision as compared with the other eye, but he did not know how much vision he had before the injury.

The fourth case was that of a professor in the university, who, in adjusting the internal workings of his automobile, allowed a wrench to slip out of his hand, striking his eyeglasses, breaking the glass and cutting the cornea. He saw the patient fifteen minutes after the injury. The iris was slightly caught in the wound. Under atropin the pupil was dilated, the eye attended to, and after three or four days in the hospital patient got along without any trouble. He had myopic astigmatism.

Dr. Major H. Worthington stated that shortly after Dr. Nance reported his case in 1907 he had one of injury to the cornea from a broken spectacle lens caused by a tennis ball. At the time he reported this case, through the kindness of the late Dr. Beard, he included in his report the case he had under treatment at the eye and ear infirmary, of a boy, who, on entering a darkened room, ran into a bed post, breaking his spectacle lens and so badly lacerating his eye that after a few days it was necessary to enucleate it on account of sympathetic irritation. The speaker had had since then two other cases of injury caused by broken spectacle lenses—one of superficial injury to the cornea, and the other with laceration of the skin of the lid. These cases all occurred in individuals wearing spectacles.

He believes that cases of injury to the skin of the lid and cheek from broken spectacle lenses are more common than injuries to the eyeball itself.

The Linear Method of Cataract Extraction—Cases Suitable for It, and Its Advantages.

Dr. William H. Wilder read a paper on this subject in which he stated that the linear method of cataract extraction has a considerably wider field of application than is usually accorded to it. In the linear method of extraction the incision is a straight one, and for making such an incision no instrument is as good as a lance-shaped knife, such as a keratome. The incision need not, in most cases suited for the operation, be a long one, but to insure that it be long enough, a wide keratome should be used, so that the cut may be eight to ten millimeters in length, if it is thought necessary, and the length can be obtained with one thrust of the blade.

The advantages of such a straight keratome incision are selfevident. The coaptation of the lips of the wound is more exact than when the incision is made with a narrow bladed knife with puncture, counter puncture and outward cut, and hence healing is more prompt. Again, with the short, straight incision the danger of gaping of the wound is less than with the long incision in the flap operation, and, therefore, the likelihood of postoperative complications is reduced.

Speaking broadly, this method is applicable for the extraction of any cataract that can be delivered through a straight cut in the cornea not longer than ten or twelve millimeters. Of course, this precludes its use in senile cataract in which the nucleus is so large that it cannot be delivered through such a small opening. But up to the age of thirty-five or forty years the nucleus of the lens is so small that it will readily escape through an opening of this size.

The author's own experience includes only one case of full-sized cataract in a person as old as forty years treated by this method. In this connection, however, one should remember that the central portion of the lens becomes sclerosed at a younger period of life in some persons than in others, and given a case of forty years one should be prepared to enlarge the incision, if necessary, which could be done with a suitable pair of scissors. Specifically, then, the method is applicable in the extraction of all soft cataracts—i. e., those in which a nucleus has not yet formed or is so small that it will readily escape through an opening made by a linear incision not larger than ten millimeters This will include lamellar cataracts, juvenile cortical cataracts and capsulolenticular cataracts in young subjects, as well as any other form of soft or cured complete cataracts in young adults under the age of thirty or thirty-five years, whether occurring spontaneously or as the result of injury.

The author then described traumatic cataract, shrunken lenses, membranous cataracts, and described the technic in detail.

In summarizing the indications for and the advantages of this method, the author pointed out that it is the operation for extraction of soft cataracts in persons under the age of thirty-five years and even older. It is most satisfactory when preceded by a free discission of the capsule. It is the operation for traumatic cataract in persons not older than forty years. It is an excellent method of operating on intractable, thick membranous cataracts. The incision, being comparatively short, straight and smoothly cut with a lance, heals more quickly because of perfect coaptation and the chance of infection is less. In many cases it is better to operate by this method for traumatic and needled cataracts than to wait for tedious absorption of lens substance and its attending changes.

Discussion.—Dr. Thomas Faith said he could conceive of but two conditions of the eye in which he would attempt linear extraction: one was traumatic cataract, and the other was following needling in a juvenile cataract. If one could tell when the lens was soft and when it was not, the extraction of cataract would be much easier than it is, but one often cannot tell when the lens is soft, even by the age of the patient. A small incision was a great advantage in that it could be closed readily, but when one attempted to deliver a lens that had not been injured or disintegrated, it was a temporizing measure. He had frequently employed linear extraction. Two days ago he resorted to it in a case of traumatic cataract of two weeks' standing. Through a linear incision and the use of a small curved director practically all the lens was removed. He would not have the courage to attempt extraction of the complete lens at any age with the linear method. The extraction of capsular cataract was often accomplished by such an incision, but preferably by means of forceps. A keratome could be introduced and thrust through the capsule if it was not too tough. If it was too tough, it could be grasped with an ordinary iris forceps or straight forceps with a very fine shank, and either the entire capsule removed or a large rent made in it.

Dr. William A. Fisher asked Dr. Wilder what method he adopted in determining the kind of bacteria which prevented him from operating, and whether he made smears or cultures.

Dr. George F. Suker said that, from a mechanical standpoint, it is more difficult to make an incision with a keratome than with a regular cataract knife; indeed, that is true of any angular knife. The line of incision is more under one's control with a straight than with an angular knife. It is exceedingly difficult to get a properly sharpened angular keratome, and far less difficult to get a sharp cataract knife.

It has been his observation that a cataract knife is far safer in the majority of hands than an angular keratome. The puncture, counter puncture and cutting sweep of a cataract knife is easier to execute than the guiding and pressure cutting of a keratome.

In his hands the cataract knife is the knife of choice for opening the anterior chamber for any intraocular operation, be this opening for an iridectomy or cataract extraction.

It is not always an easy matter to determine the size of the nucleus, not only in the mature senile cataract, but much more so in the traumatic and juvenile types. We ought not to arbitrarily set any age for the size of a nucleus, no matter what type of cataract is considered, though it is understood that the nucleus of a juvenile or traumatic cataract is less solid than in a mature cataract.

Therefore, a larger corneal section is far better than one too small, which must be enlarged by scissors.

Dr. Wilder's remarks concerning the rapid management of juvenile and traumatic cataracts are in accordance with good surgical principles, and he has followed this selfsame procedure for years in like cases. We ought not to be too hypercritical about getting nonserrated corneal incision in our cataract operations; certainly ragged incisions are to be deprecated. Even a keratome will give a serrated incision; to avoid serrations with a cataract knife, a long sweep and a persistent and accurate following up of the sweep will avoid serrations—i. e., the knife must not be allowed to lag, as it were, but once the cutting is started it is to be finished with as few strokes as possible.

When the iris is in contact with the cornea and the lens must be removed, there is no surgical contraindication for not passing the cataract knife directly through the substance of the iris in making the corneal section. Though this is not a desirable condition to contend with, yet it is not an insurmountable one.

Dr. Wilder, in replying to Dr. Fisher, said the method he had always used was to make a smear, inoculate probably two tubes, used blood agar, and then make cultures.

Keratitis Petrificans.

Dr. Harry S. Gradle reported a case of keratitis petrificans for Dr. H. B. Young and exhibited the patient.

Dr. George F. Suker reported the following cases:

A Case of Sella Turcica Decompression With Remarkable Results.

Case 1.—Mr. W., aged fifty-eight years, in 1911 had intense basal headaches associated with more or less vertigo; no nausea or vomiting. He had more or less mental symptoms, such as forgetfulness and lassitude, lack of concentration and irritability. His vision began to fail rather rapidly, and, as he expressed it, he was unable to read "across the newspapers." It was only by shifting the page that he could read the lines properly. Within six months or so vision was reduced to faint light perception in the right eye and complete amaurosis in the left. About this time the left eye began to diverge some. The case was diagnosed as optic atrophy, secondary type.

He remained in this condition until February, 1916, when he (through the courtesy of Dr. Crass) consulted Dr. Suker.

A complete physical examination (both laboratory and clinical) failed to reveal any lesion. He only had faint light perception in the right eye, limited to the papillomacular area, no color perception, no Wernicke pupil, but individual pupillary reaction to light and accommodation.

An X-ray picture of the pituitary region showed an enlarged sella with a very suspicious neighborhood (X-ray taken by Drs. Hartung and Hubeny). Upon the strength of the X-ray findings a transphenoidal sellar decompression, under local anesthesia, was made by Dr. Otto J. Stein, with uneventful recovery.

Within twenty-four hours after decompression intense photophobia and lacrimation. Within forty-eight hours after, he began to recognize more light and had distinct form perception, counted fingers rather accurately at a few inches, but no color perception. Improvement only in right eye: Left eye remained the same—amaurotic.

From then on improvement was rapid, so that at the present time he can with a + 5.00 in the right eye read at fourteen inches 6/6 type; has almost complete color perception, and his field for form almost approaches the normal. He first began to recognize blue, then green, and lastly red. He goes about unattended.

Each nervehead shows distinct evidences of having been choked, followed by a secondary optic neuritis; this in turn by an amount of atrophy.

No tumor mass or pituitary body was removed, but a large decompression was made. The decompression was only in the nature of an exploratory operation. A more radical operation is under contemplation. Further report later.

A Case of Multiple Sclerosis With Optic Nerve Atrophy and Ectopically Placed Leashes of Opaque Nerve Fibers in the Same Eye.

Case 2.—Mr. X., aged fifty years, a distinct case of multiple sclerosis, an optic atrophy in the left eye which can hardly be differentiated from a primary atrophy, showing that the nodules of sclerosis are situated almost at the entrance of the left nerve into the chiasm. In this same eye, towards the nasal side of the disc, are two islands of opaque nerve fibers separated by an area of normal retina between themselves and the optic nerve. No opaque fibers at disc in any quadrant; vision, 20/20. No improvement with any correction.

(This case is from the Cook County Hospital service.)

Paul Guilford,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

Meeting held March 18, 1916, at Denver. Dr. G. L. Strader, Cheyenne, Wyoming, presiding.

Concussion Annular Cataract.

Dr. A. C. Magruder presented R. S., aged fourteen years, who on January 5, 1916, had his head caught between the door and the doorjamb. Two days later his eye began to get red and very painful. First seen on January 11th, at which time there was intense photophobia, pain and redness. Media clear, except a long stringy opacity in the vitreous and very slight, deep, lenticular cloudiness. Temperature, ninety-nine degrees. Atropin was at once used and pupil dilated about two-thirds.

This condition remained until January 22nd, when, on account of poor home treatment, the boy was sent to the hospital, where he remained until March 3rd. During all of the time he ran a temperature from ninety-nine to one hundred degrees with normal room temperature. Typhoid or tuberculosis was strongly suspected, but both Widal and Moro reactions were negative.

Potassium iodid was given, as much as twenty drops three times a day, with the hope of absorption of the vitreous opacities; atropin was used constantly.

From February 4th to 16th atropin was not pushed as it should have been. On the latter date the pupil was very much contracted and the pupillary area cloudy. Atropin in substance failed to dilate the pupil more than one-half, and pain, redness and photophobia continued.

On February 20th, twenty-five milligrams of a five per cent solution of dionin with one-fiftieth grain atropin sulphat to dram one, was given subconjunctivally. Eye improved in all its phases except lens opacity. Vitreous opacity now much less. These subconjunctival injections were repeated February 23rd and 28th, and March 3rd. The pupil dilated ad maximum except in lower area, but it required the daily use of atropin in substance to maintain the dilatation. The pain, photophobia and redness have disappeared.

There remains the vitreous opacity and what appears to be a concussion annular cataract (Vossius type), but on the posterior capsule, which is quite out of the ordinary, and it is for this reason that the case is presented.

Blows on the eyes or head, falls or jumps, sitting down or slips on the pavement, convulsions, tetanus, lightning strokes, are cited as being causative of concussion cataract. Deutschman reported two cases of partial transient opacity of the lens in wounds of the sclera near the sclerocorneal margin. Becker reports one case of concussion cataract without rupture of the capsule—a falling icicle struck the sclera, not rupturing it, but producing a rent in the choroid. Three weeks later opacity of the lens about the size of a moderately dilated pupil.

Can cataract take place from concussion, or must the capsule of the lens have been ruptured?

Discussion.—Dr. Edward Jackson believed the opacity to be in front of the posterior capsule; possibly near the nucleus, and about its periphery.

Dr. Matson asked if fracture of the orbit could have produced the temperature.

Dr. E. T. Boyd thought the opacity to be anterior to the posterior capsule, and believed it to be of the nature commonly recognized as concussion cataract.

Dr. Magruder, in replying to question concerning the site of injection, said that when he had found synechia in a certain part of the eye, that injection in that region had seemed to give the greatest benefit.

Lens Dislocated Into the Vitreous.

Dr. E. T. Boyd presented a man, sixty-five years old, who, one week before, had received a blow upon the eye, and had since been unable to see. The fundus can best be seen with a plus 9 D., and the vision is improved with such lens. No lens reflex can be obtained, and the iris is tremulous. The lens cannot be located; this, however, may, and probably will, be possible later, as the lens becomes hazy.

Discussion.—Dr. Thompson suggested that a blow upon the forehead, with head inclined forward, might serve to displace the lens into the anterior chamber.

Dr. Boyd said that the case would be kept under observation and the lens removed if conditions became favorable.

Foreign Body in Vitreous—Cataract.

Dr. E. E. McKeown exhibited a man with the following notes: "Piece of steel struck right eye about one year ago. Cataract did not start until several months after. Had no physician at time of injury. X-ray shows foreign body in floor of vitreous. Mature cataract present, for which two needlings have been done."

Discussion.—Dr. Boyd said that as a general proposition he considered it bad practice to needle the lens of an eye in which there was a foreign body, and in this case, to say the least, it was inadvisable. The presence of steel or iron in the vitreous may at any time cause iridocyclitis, and anything in the way of needling might easily precipitate such attack. A scleral incision for magnet operation, or a large keratome corneal incision, breaking up lens matter and removing same by irrigation, followed by the introduction of magnet point with the hope of removing foreign body, would have been the rational procedure.

Dr. McKeown stated that the patient would not listen to an operation suggestive of attempts to remove the foreign body.

Dr. Edward Jackson said that in such event his treatment would have been to send the patient to someone else, as foreign body in the eye is a handicap to any operative interference.

Dr. E. R. Neeper said that he would not use magnet unless the sideroscope demonstrated that the foreign body was magnetizable.

Impairment of Vision From Drinking Wood Alcohol.

Dr. G. L. Strader presented Mr. S., aged fifty-nine years, a jeweler. November 19, 1915, patient by mistake took two drinks of wood alcohol. Drank about two ounces at one o'clock in the afternoon, and three or four hours later took another drink of about the same amount. November 20th, felt exceedingly nervous and called his physician. November 21st, vision was rapidly failing. Awoke the morning of the 22nd totally blind. No headache, and no gastrointestinal symptoms at any time. Patient had been a hard drinker for a great many years. Two and a half years ago took the Gatlin cure, after which did not drink for two years. Estimates that he drank as much as a quart of whiskey a week during the last half of 1915. Has smoked eight or ten heavy cigars a day, for years.

November 26th began to distinguish light from darkness. From that date until December 10th, when first seen, there was slow improvement.

Right eye vision, fingers at twelve inches. December 10th, left eye vision, fingers at twenty-four inches. Pupils moderately dilated and very sluggish in reaction. Absolute color scotoma. Slight retinal congestion, otherwise fundus of each eye normal. Absolute central scotoma for form. Blood pressure one hundred and sixty. Patient put in hospital. Alcohol and tobacco interdicted. Strychnin nitrat hypodermatically in increasing doses. High frequency current five minutes daily. Gradual improvement.

December 18th, vision of right eye, fingers at twenty-four inches; left eye, fingers at ten feet. Went home to have treatment continued by family physician. Was getting one-tenth grain strychnin three times a day. Improvement in vision continued until March 1st, at which time vision was reported as being: right eye, fingers, ten feet; left eye, 20/200. Since March 1st vision has been failing, and on March 17th equaled fingers at one foot for the right eye, and ten feet for the left eye.

There is marked light irritation. Nerveheads are pale, and there is considerable headache. Dr. Strader asked concerning the probable outcome of the case.

Discussion.—Dr. Jackson feared that the man would go totally blind, and as the man was drinking and smoking a little, this would tend to such result. Would watch the man for appearance of sclerosis.

Dr. J. A. Patterson asked if purgation could get rid of wood alcohol?

Dr. Thompson cited a case of alcohol amblyopia that consulted him after being blind three weeks, and in which he had sweat the man and given him calomel, effectually restoring vision. (This condition was due to grain, not wood, alcohol.) Dr. Thompson said that he did not believe strychnin was of any use in such cases.

Dr. W. H. Crisp said that he thought that the value of strychnin had been overestimated.

Dr. Boyd thought that Dr. Strader's patient would ultimately become totally blind.

Result of Operation for Symblepharon.

Dr. Bane showed a patient who had burned her eye with lye, resulting in extensive symblepharon, for which he had operated. The cul-de-sac is now of normal depth and the eye in ideal condition.

Ethylhydrocuprein Hydrochlorid in Streptococcic Conjunctivitis.

Dr. W. H. Crisp reported a case of very severe streptococcic conjunctivitis in which rapid improvement had followed the use of ethylhydrocuprein hydrochlorid. The man was seventy-three years old. The severity of the inflammation was such that the chemosed conjunctiva of the eyeball overhung the cornea, the swelling of the lids and surrounding tissues was somewhat indurated, and there was so much pain in the surrounding parts of the head and face as to suggest an inflammation of the deeper structures of the eyeball. The pus, which was very profuse, yielded a pure culture of a virulent strain of streptococci. Vigorous use of silver nitrat solution and argyrol, extending over a number of days, produced scarcely any improvement. Under the use of one per cent solution of ethylhydrocuprein hydrochlorid, thoroughly rubbed into the conjunctiva of the lids, and a one to one hundred and eighty solution of the same drug every hour at home, there was very rapid recovery from all the symptoms.

Glaucoma in a Boy of Nine.

Dr. Edward Jackson reported the case of a boy of nine years, whose eyes were supposed to be normal until last fall dilatation of the right pupil was suddenly noticed without pain or discomfort. On examination the right disc was found deeply cupped and the field much restricted, with tension of the eye, plus one. Vision normal. In the left eye there was then slight cupping of the disc; field and central vision normal.

In spite of eserin, which kept the pupil well contracted, the eyes had grown worse until vision is: right 0.3, eccentric, tension 75 mm., cup six diopters deep. Field for bright flash light in dark room, less than thirty degrees in the greatest diameter. Left, vision 1.2, tension 65 mm., cup five diopters deep.

        35
Field: 65 L. 10
        15

Iridectomy was advised, first for the right eye, and if successful in reducing tension, on the left, meanwhile keeping up the full effect of eserin.

Dr. Jackson said that this was the youngest case in which he had seen glaucoma develop.

Sudden Exophthalmos of One Eye.

Dr. J. A. Patterson reported the case of a man, fifty years old, who three days before consulting him had gotten up in the morning and found right eye proptosed to such extent that the lids would not cover the eye. No pain. Eye grounds and fields normal. X-ray showed the ethmoid and frontal to be clear. Luetin negative. Upward, inward and downward movements of the eyes are limited. Suggestions as to cause asked.

Discussion.—Dr. C. A. Walker had a case very similar. All sinuses normal. Incised outer canthus to prevent pressure; later saw some protrusion, incision of which demonstrated the presence of pus in the orbit. Patient doing well.

Dr. Jackson said that hemorrhage into the orbit sometimes produced such conditions.

E. T. Boyd,
Secretary.

Meeting held April 15, 1916. Dr. Melville Black, presiding.

An Intranasal Operation for the Relief of Dacryocystitis.

Dr. H. L. Baum, Denver, discussed in detail the anatomy of the lacrimal sac, the lacrimal bone, the nasal duct, and explained that the shortest and simplest way to reach the lacrimal sac from inside the nose was to break through the thin bone underlying the sac, and thus expose most of its internal surface. He has devised several instruments for the operation, which is done under local anesthesia, using a one-fourth per cent solution of novocain with the addition of adrenalin. The solution is injected under the mucous membrane of the operative field, and also from the outside by direct puncture of the skin into the tissues surrounding the sac, particularly between the sac and the bone of the lacrimal fossa. After instillation of about a ten per cent solution of cocain into the conjunctival cul-de-sac, the punctum is dilated and a probe passed into the duct far enough to retain it in position, where it may be left, during the operation, as a landmark. Although not necessary, it gives the operator confidence as to his exact whereabouts and serves as a firm background against which to curette for the sac wall after the removal of the bone. A flap of mucous membrane is then elevated somewhat larger than the size of the bone to be removed, and from that location, this piece of membrane being taken out entire. It is now his practice to approach the field of operation from in front, first palpating with curette to feel the firm bone of the ascending process. Knowing that the lacrimal bone is posterior to and articulates with the ascending process, it is a very easy matter to feel one's way with the instrument until this soft bone is reached, when it is broken through and curetted out, thus uncovering about the posterior two-thirds of the sac. The curette is then carried directly downward until it enters the duct, which it is advisable to open for a short distance. In most patients it is even then impossible to see more than the opening of the bone, for the sac lies out of the direct line of vision, but as it has been uncovered by the removal of the bone, it is not difficult to insert the curette through the opening already made and, with firm counter pressure from the outside, remove the internal wall of the sac with one or two sweeps of the curette. The shreds of tissue which the instrument brings through into the nose are now removed with forceps, following this with a further curettement against the anterior external surface of the ascending process, to remove all remnants of the sac wall and smooth the bony surfaces remaining. It is then possible to pass a large probe into the nasal cavity and to demonstrate by its excursion that there is a free opening into the nose for its admission. The after-treatment consists in the application of strong silver nitrat solution to the nasal opening, to prevent excessive granulation and cicatricial closure. Probing is also indicated, although it has not seemed necessary.

A larger series of cases will be needed, however, and a longer postoperative period, before he can say with certainty that this operation is as efficacious and permanent in its effect as it now appears to be.

Three patients upon whom he had performed the operation were presented.

Case 1.—Mrs. J. A. ,aged forty-five years, left sided chronic purulent dacryocystitis for past five years. Has had canaliculus slit and probes passed without relief. Operation, April 16, 1916; local anesthesia; technic as described.

Result.—After three days pus had disappeared and epiphora was practically gone. On date of presentation, April 15th, neither pus nor epiphora were present. Sound passes freely into the nose through artificial opening.

Case 2.—C. P., aged nine years. Right sided chronic purulent dacryocystitis with fistula. Has had canaliculus slit and attempt at destruction of sac with trichloracetic acid. Chronic conjunctivitis and blepharitis. Operation, general anesthesia, March 20, 1916. Technic as described. March 23rd, pus has disappeared and fistula granulating. April 1st, fistula closed, no pus, some epiphora and blepharitis remaining. On date of presentation no pus present, still some epiphora. Fistula healed perfectly.

Case 3.—Mrs. F. P., aged twenty-eight years. Chronic purulent dacryocystitis for past eight years. Has had no treatment. Operation, local anesthesia, March 7, 1916. Technic as described. Pus cleared up in a few days. March 25th, epiphora has disappeared. Apparently a cure on date of presentation.

Dr. Baum exhibited instruments which he had devised for use in this operation.

Discussion.—Dr. E. R. Neeper, of Colorado Springs, stated that he advocated trephining the tear sac by passing a two and a half millimeter trephine into the sac after splitting the canaliculus with a Bowman's knife. He stated that two or three turns of the trephine usually enabled the instrument to enter the nose through the thin bone of the lacrimal fossa, and he could remove the button of bone encircled by the trephine. Applications can easily be made to the passage and it remains open. He had operated ten to twelve cases to date, and feels that the results have been quite satisfactory. He was led to do this operation after giving it a thorough trial on lower animals.

Dr. Wm. C. Bane, of Denver, exhibited a trephine, about three millimeters in diameter, which he had devised for operating on the tear sac through a slit canaliculus.

Dr. Baum, in closing the discussion, stated that the instruments were his. He thought slitting of the canaliculus was objectionable to some ophthalmologists and should not be performed.

Dr. Neeper added that the slit sooner closes and, therefore, isn't objectionable.

Extensive Laceration of the Cornea.

Drs. Wm. C. and Wm. M. Bane, of Denver, presented the following cases:

Case 1.—D. S., Italian, aged twenty-nine years. About seven o'clock on morning of March 28th, while chopping wood, he was struck in the right eye by a long piece of kindling. Vision in left eye was light perception. The cornea was severed from its attachment in a crescentic line around the upper and nasal borders about half the circumference. The eyeball was collapsed, and the corneal flap turned back on itself, exposing the vitreous. Iris considerably torn and distorted. No lens detected, and about one-half or more of the vitreous had escaped.

After instillation of cocain, four per cent, corneal flap was turned back to nearly original position and stitched in place. The eye was covered with a pad, and has been dressed each day and atropin used.

Vision has been improving, and he now counts fingers readily. The lost vitreous has been practically all restored, but there has been a little leakage continually at the wound edge, which has been pushed forward and kept open by a part of the iris. When bulging of wound was noticed eserin was begun.

The left eye, with an extreme projection of the cornea, had vision of 5/30, but with a plus 2.00 sphere combined with a —11.00 cylinder at axis 65°, vision comes up to 5/10.

Extraocular Muscle Paralyses.

Case 2.—Miss L. M., aged thirty years, stenographer.

Past History.—Severe nervous shock five years ago, due to the sudden death of her father and mother, from the effects of which she has never completely recovered. Trouble with the eyes began three years ago, when she had double vision, one object appearing directly above the other. This lasted some time, finally disappearing. In October, 1915, pupil of the right eye became widely dilated, she was unable to rotate the right eye upward and there was marked drooping of the right upper lid. Potassium iodid was prescribed at that time, and there has been some improvement during the past six months. At no time has she had pain or headache, and the vision has remained normal.

Examination.—Patient first seen April 1, 1916. Vision right and left eyes, 5/5. Fields normal for white. Pupils: Right larger than left, about four millimeters in diameter, somewhat irregular, quite sluggish to light and to accommodation. Left pupil normal. Muscles: Weakness of levator of right upper lid, with slight drooping. Almost complete paralysis of the right superior rectus. Exophoria thirty degrees, and left hyperphoria fourteen degrees. Blood examination not yet made.

Diagnosis.—Paralysis of the right external rectus (sixth nerve), partial paralysis levator palpebræ and superior rectus and sphincter pupillæ (third nerve), probably due to lues.

Optic Atrophy.

Case 3.—Miss J. M., aged thirty-four years, graduate nurse. First seen April 8, 1916, giving the following history: Sixteen years ago her trouble began with headache and pain in the eyes. She consulted an oculist, who prescribed glasses. About the same time, following an attack of scarlet fever, she noticed that with the right eye the right half of the visual field was more distinct than the left. This defect has been present ever since. Lately she has suffered with a return of the headaches, and has noticed a wavering of the vision. Examination shows the vision to be: Right eye, 5/10; left eye, 5/5—. Under a cycloplegic she accepts: Right eye, plus 0.25 sphere equals 5/7—; left eye, —0.25 sphere combined with a plus 0.37 axis 115° equals 5/5—.

The right fundus shows marked atrophy of the nerve head. No other changes manifest. Left fundus normal. Pupils equal, the right one reacting slowly to light. Fields: The right eye shows the nasal field to be lacking, as shown on the chart. In the left eye the fields are normal.

Symblepharon Operation.

The following case was shown at the March meeting:

Mrs. S., aged sixty-six years, housewife. First seen March 11, 1915. In September, 1914, the patient received a severe burn of the right eye from a scale of concentrated lye, which was not removed for three hours. The upper lid, the lower fourth of the cornea, and the lower cul-de-sac were badly burned. The result was the formation of a symblepharon, with cicatricial bands extending from the nasal half of the lower lid onto the lower fourth of the cornea, almost obliterating the lower cul-de-sac.

On July 8, 1915, under cocain anesthesia, the symblepharon was detached from the cornea, and, with elevation of the underlying conjunctiva, was carried down to the bottom of an artificial cul-de-sac, where stitches were carried through and tied externally on the skin surface of the lower lid. The denuded area on the eyeball was covered by two flaps of the conjunctiva brought down from the upper nasal and temporal sides. Fine silk sutures were used to close the gaps thus made above, and to hold the flaps in place below.

Healing took place rapidly, and the result has been very gratifying.

Discussion.—Dr. Melville Black, of Denver, felt that if the right eye of the Italian recovers at all, it will be after a long drawn out uveitis. He would, therefore, draw out the iris and cut it off, after first preparing a large conjunctival flap above. so that the latter can be drawn entirely over the cornea and maintained in place for seven or eight days. This will give the corneal wound time to entirely close. He thought the eye would lose all of its vision without an operation, on account of the uveitis, but that with an operation, some vision may be saved.

Dr. Neeper thought Dr. Black's suggestion was a very good one and it should be put into effect soon.

Dr. Edward Jackson, of Denver, stated that he had seen large iris prolapses flatten down after a number of weeks following a cataract extraction, but that such cases are a source of worry to both the oculist and the patient.

Dr. D. H. Coover, of Denver, would snip off the prolapsed iris and use lunar caustic.

Dr. F. R. Spencer, of Boulder, stated that a conjunctival flap would be better than a stitch in the cornea, in answering Dr. Wm. C. Bane's inquiry regarding the advisability of a corneal suture.

Dr. Wm. C. Bane, in closing the discussion of this case, stated that the nasal and temporal margins of the wound had closed, but the prolapsed iris had prevented closure of the rest of the corneal wound. He had used sutures to hold the edges of the cornea together.

Dr. Neeper suggested bichlorid of mercury for the leutic ptosis.

Dr. Spencer stated that the optic atrophy of the left eye was probably due to an accessory sinus disease following scarlet fever, although it is rather difficult to be absolutely sure of this from the history of the case.

Tortuous Retinal Vessels.

Dr. Boyd, of Denver, presented Mr. W., aged twenty-five years. Mother and a number of mother's family died of tuberculosis. Father died of arteriosclerosis at an advanced age. Personal history of bronchitis. Hemorrhage one year ago, accompanying a cold, presumably from the lungs.

The patient was presented because of the marked tortuosity of the retinal arteries; he also called attention to the slight pressure upon the globe required to produce pulsation of the arteries on the disc. This latter is probably explained by the low diastolic pressure.

The patient is a civil engineer, and uses his eyes for very close work, often resorting to and working with a magnifying glass. He is subject to headache, and is frequently troubled with evanescent fading of vision, amounting to obscuration. Under a mydriatic he is hyperopic one diopter. Systolic pressure, one hundred and twenty-five; diastolic pressure, seventy millimeters.

It is not at all impossible that the tortuosity of the arteries which exists throughout the fundi is due to a state of relaxation, which is claimed to be the earliest indication of sclerotic changes which are to follow subsequently, and yet there is not a condition of general dilation, except that the first and second divisions are equally as large as the primary vessels.

Corneoscleral Growth.

Dr. Boyd, of Denver, also presented Mr. R., aged thirty-four years, machinist. In December last was struck in the left eye by a punch, and since that time a growth now five by four millimeters high has appeared at the sclerocorneal junction, internally, at site of original injury.

Discussion.—Dr. W. H. Crisp thought Dr. Boyd's case was one of functional disturbance.

Dr. Patterson stated the case was likely due to parental tuberculosis. The patient has bronchitis, which may be tuberculous, and the patient's mother died from tuberculosis. He feels that such a family history is very important in this type of case, and is almost certainly responsible for the functional disturbance. He has had a number of cases which have substantiated this view.

Dr. Jackson stated that as soon as the pressure from the finger equals the diastolic pressure there is produced an arterial pulsation in the retinal vessels. This pulsation is very easy to obtain, and, therefore, he wouldn't attach much importance to this symptom, especially in young persons.

Buphthalmos.

Dr. H. R. Stilwill, of Denver, presented a child four years of age with buphthalmus of the left eye following ophthalmia neonatorum. The choroid and sclera showed the most marked stretching above. This case was presented some time ago at a former meeting of this society.

Symblepharon.

Dr. Wm. H. Crisp, of Denver, re-presented the case of lime burn involving the right eye shown two months ago. At the present time (April 15, 1916) it shows an extensive symblepharon above and below. The vision has been reduced to light perception. The superior cul-de-sac is almost obliterated, although more of the lower remains, so that the movement of the eyeball is very limited.

Discussion.—Dr. Black thought the eye offered a good stump for the prothesis.

Choroidal Endothelioma.

Dr. D. H. Coover, of Denver, reported the following case: Mrs. L., aged seventy-six years. When seen, February 26, 1914, gave the following history:

Three years ago was struck over the right eye by a picture hook; after this the eye felt full for about one week. For the past seven months has noticed the vision failing in the right eye, although with glasses it was somewhat improved.

July 23, 1914, returned, complaining of the eye being uncomfortable. Upon examination he found the vision about nil and a detachment of the retina in the upper and nasal side.

On February 28, 1915, complained of attacks of pain in the eye which came on at intervals of one or two months. In November, 1915, had an attack of grippe, after which the pain became more severe and lasted much longer.

Upon examination found no light perception, lens cataractous, tension plus three, anterior chamber shallow, the subconjunctival vessels engorged, and sclerotic bluish over the ciliary region. The iris showed deposits along its roots. Enucleation advised.

March 11, 1916, the eye was removed and found to contain a tumor. The eye was examined by Dr. William C. Finnoff. The tumor was shown and the pathologic report of Dr. Finnoff read.

Horizontal section of eye shows a tumor occupying two-thirds of the eyeball. An area two and one-half millimeters in the anterior portion is deeply pigmented, but the tumor mass, posterior to the area, has very little pigment. The lens is pushed forward into the anterior chamber, which is shallow. The iris is in contact with the cornea over an area of one and one-half millimeters from its root.

Microscopic examination reveals a tumor mass arising from the choroid, extending from the posterior portion of the ciliary body on one side to eight millimeters from the optic nerve entrance on the other. The tumor cells extend from half of the posterior portion of the lens backward to the sclera. The retina is detached and pushed forward by the tumor, and its attachment to the optic nerve has been severed.

The deeply pigmented area is made up of large blood channels, resembling choroidal vessels, which are surrounded by large polyhedral cells, which arise directly from the blood spaces. Large masses of dark pigment are seen; the pigment is both intra- and extracellular, and is granular and needle shaped. The blood channels are filled with blood, and their walls are made up of tumor cells; only an occasional channel has an unbroken endothelial wall.

Posterior to the pigmented area the tumor cells are free from pigment, and the blood channels are fewer in number and further apart. The cell nuclei are oval and spindle shaped, and the cells are polyhedral. The cells have migrated through the sclera and are seen along the perivascular spaces, and also in the tissue which adhered to the globe. The optic nerve has entirely been replaced by tumor cells.

Diagnosis.—Endothelioma of choroid.

Pyorrhea Alveolaris.

Dr. Neeper reported a case of an elderly man, aged seventy-two years, with extensive pyorrhea alveolaris. He complained of failing vision, which was found to be 5/80. This was improved to 5/40 after extracting teeth.

Optic Atrophy Resulting From Frontoorbital Abscess.

Dr. G. F. Libby, of Denver, reported a youth of eighteen years with orbital cellulitis, lid edema, intense conjunctival congestion and marked exophthalmos of the left eye, seen in consultation with Drs. W. H. Bergtold, W. J. Le Rossignol and E. W. Collins. Two weeks before this examination, fronto-ethmoiditis developed following active exercise and swimming in a gymnasium pool. The boy then went to his home in the country.

Orbital abscess supervened, pointing just above the inner fourth of the left eyebrow, under the periosteum. There was also a discharging fistula back of the incisor teeth in the hard palate. The orbital abscess was discharging creamy pus through a fistulous tract, and was promptly incised by Dr. H. R. Bull. The fever was high, pain great, and the patient was collapsed, with mentality sluggish. The eye was blind. The ophthalmoscopic picture was that of destruction of the central vessels, due evidently to compression. Dr. Collins used suction frequently for many days, to promote drainage externally, together with intranasal treatment, while Dr. Bergtold gave general treatment. An autogenous vaccin was administered every five days by Dr. Collins . The pus formation ceased, the fistulæ closed, the eye resumed a normal appearance, and the patient regained his customary good health. Five weeks after the first ophthalmoscopic examination the media of the left eye were clear, and there were optic and retinal atrophy and degenerative changes in the macular region. The retinal veins were then much shrunken, while many of the arteries were thread-like. Early and appropriate intranasal treatment might have saved this eye and avoided the severe and dangerous constitutional disturbance.

Hyalitis Secondary to Accessory Sinus Disease.

Dr. G. L. Libby also reported a woman aged thirty-six years, who had complained of attacks of blindness occurring once a month in the right eye, lasting from a few minutes to a half hour; also a small floating cloud before this eye. Corrected vision equals: Right eye, 5/6; left eye, 5/5. The ophthalmoscope showed: Right eye, floating vitreous plaque above, with central dust-like opacities; left, media clear and fundus normal. The patient stated that she was "rather run down." Reexamination sixteen months later revealed no change in the vitreous, the refraction or the vision. The attacks of transient blindness no longer occurred, but the floating opacity was still noticed. Three months later the vision of the right eye was suddenly lost. The patient was seen by Dr. C. E. Walker, and by him referred to Dr. T. J. Gallaher, for rhinologic examination and treatment.

Dr. Gallaher gave the following report: "Nasal septum deflected to the right, bilateral hyperplastic ethmoiditis, bilateral sphenoiditis, with slight pus discharge. Pulsation in both sphenoids discernible by use of the rhinopharyngoscope. The following operations were immediately performed: First, exenteration of the left ethmoid cells and cutting down the anterior wall of the sphenoid on the left side. Second, an extensive septal submucous resection. Third, exenteration of the ethmoid cells and removal of the anterior wall of the sphenoid on the right side. It is to be noted that operation on the left sphenoid was immediately followed by improvement in vision of the right eye. As demonstrated by Onodi and others, diseases of the sphenoid sinus and posterior ethmoid cells may affect the opposite eye. Therefore, whether one or both eyes are involved, it is necessary for the rhinologist to carefully examine the sphenoids and ethmoids of both sides in relation to either or both eyes. After the third operation, vision rose to ability to read the newspaper with the right eye."

The case then came under the care of Dr. Libby and Dr. H. E. McCollum, the family physician. Under courses of potassium iodid internally and dionin instillations the vision gradually rose to 5/8 in two more years, and the vitreous showed only several thin floating plaques and dust-like opacities. This improvement held one year later, when the patient was last seen. Dr. Libby stated that he reported this case not only to point out that the source of the hyalitis was intranasal and to show the necessity of prompt and radical rhinologic work, but to raise the question of the diagnostic significance of vitreous opacities.

Retinitis Proliferans.

Dr. Melville Black presented the case of a young man seen several years ago with neuroretinitis. Later a massive exudate developed in the fundus of the left eye, so that there was distinct elevation of the posterior portion. The elevation amounted to six or seven diopters. Later the right eye became involved, and has passed through almost the same identical stages. The macular region of each eye is decidedly blurred. A diagnosis of tuberculosis of the retinal vessels was made, and, after being seen in consultation with Dr. Edward Jackson, tuberculin was administered, beginning with small doses and gradually increasing until he responded by a local, a general and a focal reaction. He was given small doses of tuberculin for months, but without material improvement. Later, Cary's treatment with iodin was used; but, in spite of everything which could be done, retinitis proliferans subsequently developed. At the present time he has almost no vision left in either eye.

Adherent Leucoma—Pneumococcus Ulcer.

Dr. Melville Black also presented the case of an old gentleman, about seventy-five years of age, who suffered an injury of one eye in 1874. In 1894 a corneal ulcer developed which perforated and left an adherent leucoma. Recently this eye was injured again, so that when he came to the clinic there was marked pericorneal inflammation, hypopyon and ulcus serpens. The pneumococcus was demonstrated in swabs and cultures from the ulcer. Cyanid of mercury, 1/1500, was injected subconjunctivally and ethylhydrocuprein hydrochlorid used. Secondary glaucoma developed, and, as the ulceration was extensive, a Saemisch incision was made, with liberation of the pus in the anterior chamber. The wound had to be probed daily to keep it open and liberate the pus. Pasteurization, in accordance with Prince's method, was used, so that at the present time the cornea is clearing, especially in the superior portion.

Pterygium and Conjunctival Cyst.

Dr. Melville Black also reported the case of a young man, aged twenty-eight years, moulder by occupation. Hot metal flew into the right eye twelve years ago, producing a severe burn between the inner canthus and the inner limbus. At the present time he has a large and very vascular pterygium, extending from the inner canthus of the right eye to beyond the inner limbus. This was obscured near the limbus by a light gray cyst measuring about four by four and a quarter millimeters in size and filled with light yellow serous fluid. Dr. Black dissected out the cyst, under cocain anesthesia, and transplanted the pterygium below by McReynolds' method.

Calcareous Lens and Choroid.

Dr. Melville Black also exhibited a calcareous lens and choroid in an enucleated atrophic eyeball. The lens was almost perfect in size and shape, but was a dirty yellow color and of stone-like hardness.

Congenital Defect of Choroid and Retina.

Dr. F. R. Spencer, of Boulder, reported the case of Mr. G. C. R., aged twenty years, student, first examined February 28, 1916. He gave the following history: Has been having almost constant headache recently, with inability to see one-half of any object with the left eye.

Vision right eye, 15/10—1 and Jaeger eleven; left eye, 1/200, Jaeger fourteen. The anterior segment of each eye was negative. Keratometer: Right eye, 1.00 D. 90 plus 180—; left eye, 1.00 D. 75 plus 165—.

Under a cycloplegic (hyoscyamin) vision of right eye. 15/100, equals 15/10 with a plus 2.00 combined with a plus 0.25 axis 90°; vision of left eye, 15/200—, equals 15/200 with a plus 1.00 combined with a plus 0.25 axis 75°.

The right fundus was negative, but the left showed a narrow myopic crescent on the temporal side of the disc, and a disease of the macula about one disc diameter in size, with the white sclera showing through the atrophic choroid and retina. There was some pigment in the periphery of this area.

Diagnosis.—Congenital defect of choroid and retina, probably due to intrauterine disease.

When patient is questioned closely, he admits that vision in the left eye has been defective for at least seven or eight years. (Patient has chronic pansinuitis with mucopurulent discharge, and very definite involvement of the right frontal and right anterior ethmoidal cells, although the doctor doesn't believe this is in any way responsible for the left fundus disease.)

Bilateral Absolute Glaucoma.

Dr. F. R. Spencer also presented the case of Mrs. H. R. M., aged fifty-four years, widow, first examined January 17, 1916. She gave the following history: About nine years ago the right eye became inflamed and painful, and the sight failed rapidly, so that in a few weeks' time she was unable to see even very large objects with this eye. She did not consult a physician, and nothing was done to restore the vision. Six weeks ago the left eye became inflamed and painful, with rapid loss of vision. She consulted a physician, who evidently made a diagnosis of iritis, as he prescribed atropin, and reassured her that as soon as the inflammation left he would fit her with lenses and she would see perfectly with the left eye.

The examination revealed the following: Right eye, blind: left eye vision, 1/100; no Jaeger. Right eye showed pronounced superficial and deep pericorneal injection; the pupil was eight to ten millimeters in diameter; stationary; the iris was dirty grayish brown in color, the anterior chamber was shallow, and the tension was plus three. Left eye showed almost the same condition.

The ophthalmoscopic examination revealed the following: Right eye, absence of red fundus reflex; hypermature cataract with almost glistening white hypertrophic anterior lens capsule, and the lens was tremulous. Left eye, cornea steamy; lens and vitreous slightly hazy, with a definite diffuse opacity in the lower part of the lens and an opacity of less distinctness in the entire periphery; definite glaucomatous excavation of the disc with eight to ten areas of hemorrhage from one to three millimeters in diameter scattered over the fundus.

Diagnosis.—Absolute glaucoma each eye.

A trephining operation was advised and performed the following day at the lower sclerocorneal margin, according to Elliot's technic. The lower limbus was selected because her eyes persistently turned up, in spite of her efforts to turn them down, as is so apt to be the case in which eyes are blind or nearly so. A small peripheral iridectomy was performed in each eye.

Healing of the wound was uneventful, and the tension gradually became lower. March 14th it was forty-two millimeters in the right eye and twenty-three millimeters in the left eye by Gradle's tonometer. This afternoon the tension was forty-two millimeters in the right and thirty-seven millimeters in the left eye. The right eye has evidently been glaucomatous too long for the tension to become normal, but the left eye, so far, promises more improvement. Vision in right eye has not improved. Left eye vision has improved so that she can recognize coarse objects.

Discussion.—Dr. Crisp stated that a Denver physician has a similar macular lesion to that of case one.

Dr. Libby said he would not remove the left cataractous lens from the case with glaucoma, as he felt it best to let well enough alone—for the present, at least.

Dr. Patterson suggested that the macular disease might be due to maternal strain at labor or to a forceps delivery.

Dr. Black expressed the same opinion. He suggested the possibility of tuberculosis in the first case. He wouldn't do a cataract operation on the left eye in the second case, but he would resort to massage in order to lower the tension.

Dr. Jackson stated that hemorrhage is frequent at birth, and is very likely responsible for the macular disease. He thought tuberculosis less likely, although he felt the disease must have been of an inflammatory nature.

FRANK R. SPENCER,
Secretary.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Stated meeting, held January 13, 1916. Dr. Wm. Zentmayer, chairman.

Symposium on the Ocular Changes Due to Brain Tumors. The Neuropathology of Choked Disc.

Dr. John H. W. Rhein (by invitation): In discussing the neuropathology of optic nerve changes in brain tumor, it will be necessary to briefly refer to the mechanism of the production of choked disc or papillitis. Several theories have been advanced to explain this, of which it will be necessary to refer only to the backwater theory of von Graefe, the inflammatory or toxic theory, and the mechanic or lymph space theory.

The backwater theory of von Graefe explains the choked disc as being due to a venous stasis occasioned by the obstruction to the return of venous blood from the cavernous sinus, but this theory is not tenable since Sesamann demonstrated the anastomosis between the ophthalmic and the interior facial veins.

The inflammatory or toxic theory, as advanced by Leber and Deutschmann, claims that choked disc is not merely a stasis, but an inflammatory condition due to an irritation set up by the presence of a toxic fluid, this fluid becoming infected by reason of the intracranial disease or the lesion primarily causing the trouble. Deutschmann contends that it is due to a pathogenic microorganism. On the contrary, Durst did not see any action of microbes in the causation of papilledema.

Uhthof, basing his theory on a study of eight hundred cases in literature, and on his own experience, did not believe that the theory that choked disc was a primary inflammatory process was tenable; not that it had ever been successfully demonstrated that toxins of microorganisms were the cause of choked disc, the rare presence of choked disc in meningitis speaking against this theory. Inflammatory appearances, he concluded, were of a secondary nature. They were not always present in early cases. Bergmeister, Cushing, Spiller, Schick and others have disproved the presence of inflammatory changes in the early stages. On the other hand, Liebrecht found an inflammatory process in the neurilemma, and Elschnig found inflammatory appearance in all his cases. The latter stained his specimens by the Marchi method. Hipple, on the other hand, studied two cases by the Marchi method, and found no inflammatory changes. Wildbrand and Saenger found that the inflammatory change was very insignificant, and rarely was there any increase in the nuclei.

The theory which is generally accepted is the mechanic theory of Schmidt-Rimpler, which is explained on a basis of increased intracranial pressure which forces an increased amount of subarachnoid fluid into the intersheath spaces of the optic nerve or into the lymph spaces, causing edema, congestion and lateral inflammation. This theory is supported by the experiments of Merz and those of Cushing and Bordley. According to Paton, Gordon, Holmes and Schieck, lymph stasis is the cause of choked disc. Schieck found primarily the lymph spaces in choked disc extensively distended, and he observed edema, swelling of the papilla, swelling of the nerve fibers, and, secondarily, a reactive inflammatory appearance with proliferation of the connective tissue and of the glia. Later the same observer expressed the view that papilledema was caused by the entrance of cerebrospinal fluid into the preformed perivascular lymph spaces of the axial bundle of the optic nerve and along the central vessels into the disc.

The cause is the excessive pressure of the fluid, or intracranial pressure. Local stasis in the intravaginal space of the optic nerve, persistent decrease of the intraocular tension, and collapse of the vessels of the axial bundle after profuse hemorrhage, were also factors. In a microscopic study of eight eyes he did not find any sign of inflammation. The perivascular lymph spaces in the central bundle were not closed, but were in open communication with the intervaginal spaces. The lymph space was extensively distended. Marked distension of the perivascular spaces around the branches of the central vessels was characteristic. The filling of the lymph spaces was due to a flux of fluid in the peripheral direction, occurring at the lamina cribrosa, and owing to the counter pressure of the vitreous the fluid fills the perivascular spaces of the retinal vessels, giving rise to an appearance of edema. He experimented upon monkeys, producing increase in intracranial pressure, and believed that this experimental work shows that the papilledema was due to the quantity of fluid and pressure rather than to the quality of the fluid, and that the latter was not inflammatory.

The neuropathology of the choked disc can be summed up as follows: There is simple edema of the nerve stem, chiefly around central vessels, and hemorrhage into the nerve. The vaginal space is distended, and this is the seat of capillary hemorrhages and effusions, and also lymph and endothelial proliferation. The lamina cribrosa is humped, and there is distention of the lymph spaces. The inflammatory cases show perineuritic changes. Varicosities, fan-shape appearances, hypertrophy and swelling of the nerve fibers have been described. Perivascular round cell infiltration is present in inflammatory cases, and blood vessel changes, consisting of thickened wall, occlusion of the lumen, and infiltration of the adventitia. The glia is proliferated and the connective tissue of the septa is thickened and infiltrated. The myelin sheaths present changes, and there is atrophy of the nerve fibers, similar to changes found in the spinal cord following pressure. Experimentally, the nerve becomes edematous, the lamina cribrosa is distended by the edema, the papilla is pushed forward, the vessel becomes swollen, the vaginal space distended, and there is hemorrhage into the vaginal space, and in one case infiltration.

Discussion.—Dr. Charles R. Heed reviewed the classic picture of choked disc or papilledema, and exhibited several paintings illustrating the ophthalmoscopic changes found in cases affected with brain tumor. A summary of other affections, such as sinus disease, nephritis, grave anemias, serious intoxications, many of the acute infections, etc., producing changes simulating choked disc, were discussed. The ophthalmoscope was lauded as the most valuable single aid in arriving at a diagnosis of brain tumors.

Disturbances of the Ocular Muscles.

Dr. Walter W. Watson spoke on the disturbances of the ocular muscles in tumors of the brain. He said that intracranial disease as a menace to the integrity of the ocular muscles had been known for many years, but only in a vague way until von Graefe in 1854 first called attention to the appearance of the intraocular end of the optic nerve in many cases of brain tumor, when a new impetus was given to the study of the ocular muscles from like causes.

While symptoms due to pressure upon the nerves supplying the ocular muscles in their course from the base of the brain are so frequent as to be quite familiar to all clinicians, symptoms following brain lesions due to tumors and degenerating areas in or near the cortical centers of these nerves are rather rare and therefore not well known.

Brain tumors may affect the nerve centers in the cortex of the brain known as the higher centers, or the nerve nuclei in the floor of the fourth ventricle, when it is known as nuclear paralysis; or the lesion may be in the root fibers as they emanate from the nucleus and coalesce to form the nerve trunk just before leaving the brain, when it is specialized as fascicular paralysis. Tumors that affect the connections of the nuclei of the nerves with the cortex, Dr. Watson pointed out, do not in general cause paralysis of the individual muscles of the eye, but may in these situations affect the coordinate ocular movements—that is, convergence, divergence, and parallel movements. According to Willbrand, there is an exception—ptosis.

The theory was supported that convergence and divergence are reflex phenomena, with a possible center in the cortex or optic thalamus, by quoting cases of cortical lesions from tumors in which there was paralysis of voluntary ocular motion with a preservation of reflex or automatic movements; yet it is undoubtedly true that loss of movements of convergence and divergence are probably brought about from lesions involving the tracts in the pons and cerebral peduncles.

Tumors of the cerebellum may give rise to an inability of both eyes to travel to the right or left more than the median line, the eyes turning away from the side of the lesion. Small tumors of the pons involving the abducens nucleus are likely to cause paralysis, or later eversion without a paralysis of convergence, the abducens affected being on the opposite side to that of the hemiplegia, a point for differential diagnosis with cerebral tumors where the abducens involved is on the same side. In summing up, he said that in the majority of cases where a tumor involving the pons is associated with paralysis of ocular movements, either convergence or divergence is lost.

Attention was given to the fact that while paresis or paralysis of the sixth nerve may be strictly of localizing value; on the other hand, it may be an indirect symptom of a tumor of large size in various regions of the brain, and that a tumor to cause a simple paralysis of the sixth must be so situated as to cut off the emergent root fibers—that is, be a fascicular paralysis.

Function of the third nerve was interfered with in tumors involving the nerve nuclei, the corpora quadrigemina, or the gray matter about the aqueduct of Sylvius, though complete paralysis may be produced by tumors involving the frontal or temporal lobes or the peduncle. Tumors of the pituitary body may produce symptoms indicative of involvement of the third, fourth or sixth nerves.

The pupillary reflex arc is disturbed, according to Casper, when the lesion is near the sphincter nucleus; or, as in Moeli's case, from a tumor involving both sides of the third ventricle. Anisocoria and hippus may be present in tumors involving the sphincter nuclei of the third nerve; and in the production of the Argyll-Robertson pupil, Uhthof places the lesion between the external geniculate bodies and the sphincter nucleus.

Lastly, Dr. Watson referred to nystagmus as being present with almost all cerebellar tumors, and in tumors of the quadrigemina or frontal lobes it may be one of the chief symptoms.

Changes in the Field of Vision in Brain Tumor.

Dr. Wm. Zentmayer: One of the early and not infrequent disturbances of the field of vision in brain tumor is recurring temporary obscuration of the entire field—that is, blindness. Such attacks may be uni- or bliateral. The frequency of their occurrence varies from several attacks daily to perhaps a single occurrence. They are probably due to vasomotor disturbance, or possibly arise from tumor toxemia.

Visual phenomena, such as phosphenes, scintillating scotomata or hallucinations, occur, and when in association with hemianopsia usually occupy the dark field. They are not of localizing value, although perhaps more common when the visual memory in the occipital region is affected.

Aside from field defect of a symmetric nature, disturbances of the visual field in brain tumor are those resulting from the local effect of the papilledema or optic atrophy. Perhaps the most constant change is that of enlargement of the blind spot. The peripheral defects vary, being influenced by the degree and character of the swelling. Thus, a uniform swelling would produce a concentric contraction, whereas a more unequal swelling would produce irregular contraction, with possible reentering angles. Some have explained binasal hemianopsia in this way: Interlacing of the color fields is probably of less diagnostic importance than was for a time believed. When the growth is so located as to produce pressure upon the visual tracts, either directly or indirectly, hemianopsia results. Lesions in the anterior or posterior crotch of the chiasm may produce bitemporal hemianopsia. In hypophyseal disease the development of the hemianopsia is usually gradual. Often the first indication is a slant to the upper outer limits of the field, and this is usually manifested first in the color field. Even after a true hemianopsia has developed it may for some time be only a hemiachromotopsia. If you recall the arrangement of the fibers at the chiasm it will be clear to you why the hemianopsia produced by tumors at this position are apt to have very irregular dividing lines between the seeing and blind areas. Often, instead of a true hemianopsia, we have only symmetric defects. And it must not be forgotten that homonymous lateral hemiaposia is at least half as frequent as bitemporal. A characteristic of hemianopsia due to pituitary disease is the variability of the defect from day to day, as it were, and the occasional spontaneous or postoperative recovery, even after the lapse of years, showing that the defect has been due to a physiologic blocking of visual impressions and not to destructive changes. The possible occurrence of central or symmetric pericentral scotomata as an initial finding in pituitary disease must not be forgotten.

A growth pressing upon either the dorsal or ventral surface of the chiasm can produce either a superior or inferior hemianopsia. Binasal hemianopsia due to tumor must be of extreme variety, as it requires a double lesion to produce it, such as could result from atheroma of cerebral vessels.

In lesions behind the chiasm, the dividing line between the seeing and the blind areas of the field is usually a vertical one, commonly with preservation of the fixing point in the seeing area. There are exceptions, however, as in basal lesions occasionally the dividing line is irregular. The significance of hemiacromatopsia in lesions behind the primary centers is in dispute; some hold it to be the result of a cortical lesion of less intensity than where the loss of vision is complete. Another phenomena said to indicate a cortical lesion is "vision nulle," a condition in which the patient is unconscious of the field defect. Altitudinal hemianopsia can be produced by lesions of the calcarin area. It is probably that the lesion is a homolateral one. A double homonymous hemianopsia may result from a growth invading both hemispheres.

It is obvious from what has been said that hemianopsia of the homonymous type is of little localizing value in itself, but in association with other symptoms, such as disturbances of pupillary reactions, oculomotor and other cranial nerve palsies, speech defects, fundus changes, hemiplegia and hemianesthesia, etc., its presence assists in localization.

WALTER W. WATSON,
Secretary.

BOOK REVIEWS.

Refraction of the Human Eye and Methods of Estimating the Refraction.

By JAMES THURINGTON, A. M., M. D. Published by P. Blakiston's Son & Co., 1012 Walnut street, Philadelphia, Pennsylvania. Price, $2.50.

This book is designed to contain in one volume the subject matter of the author's previous works on refraction. It is especially adapted for beginners, being written in a simple style, well illustrated, and without the involved formulæ which are necessary for an exact understanding of optics, but which are too complicated for the average student. Enlargements and revisions make this work valuable even to those who possess the other books of the author. C. L.

Transactions of the Colorado Ophthalmological Congress.

Contains the papers read before the first annual meeting at Denver, July 22 and 23, 1915. These papers and discussions have appeared in earlier numbers of the ANNALS. C. L.

Transactions of the College of Physicians of Philadelphia.

Contains papers read before the society from January, 1915, to December, 1915. Of special interest to the ophthalmologist are the papers on "Mendelian Laws of Heredity and Their Application to Eugenics," by Alfred Gordon, M. D.; "Visual Phenomena in Pituitary Body Disease," by G. E. De Schweinitz, M. D.; and the Proceedings of the Ophthalmological Section. C. L.

L. Rogers, M. D.

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XXVIII.

INTIMATE RELATION BETWEEN THE EYE AND THE EAR, NOSE AND THROAT, WITH REPORT OF SOME UNUSUAL CASES.*

JOSEPH C. BECK, M. D.,

CHICAGO.

I have no intention of elaborating on the intimate relation between the eye and the nasal accessory sinuses, except to call your attention to the fact that I presented this subject before this society about five years ago, in an article entitled "On the Rationale of the Eye Affections Due to Sinus Disease, Based Upon the Study of the Surgical Pathology of the Accessory Sinuses," which I desire to publish at this time. Nor do I intend to enumerate the many diseases of the eye that may be brought about by the diseased conditions of the sinuses, and also cured by proper attention to these structures. My purpose is to bring before you a few cases illustrative of what I believe to be most important—namely, the absolute necessity of the co-relation of the ophthalmologist and the otolaryngologist; more than that, the ophthalmologist and most of the specialists in other branches. It is a question with me at the present time whether we should not have a pathologist, internist, neurologist, roentgenologist, etc., who should devote their time exclusively to the study of the diseases of the head and neck.

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*Read before the Chicago Ophthalmological Society, May 22, 1916.

I can see a splendid opportunity for some ophthalmologist and otolaryngologist who have had a good clinical experience, to devote their time to laboratory work, including roentgenology, because such men would be more able to judge the findings, both clinical and laboratory, and be of great assistance to all of us. In fact, there is to my knowledge such a man in New York City, and his discussions are always a great finish and touch to a paper that is being presented in our department.

In the presentation of these cases I will omit much of their histories, owing to the lack of time and space, but will attempt to bring out the salient points. The subjects that I wish to present are:

1. *Labyrinth irritation from the eyes, and, vice versa, eye irritation from the labyrinth.*
2. *Ethmosphenoiditis with orbital cellulitis simulating cavernous sinus thrombosis.*
3. *Infected ethmoidal cyst with periodic exophthalmos.*
4. *Recurrent unilateral iritis of eighteen years' duration; analysis of cause.*
5. *Nonsuppurative sinuitis practically causing blindness (diffuse edema of retinae); operation; complete recovery of vision.*
6. *Tumor of hypophysis with unusual complications; postmortem findings; description of a new operation.*
7. *Suppurative dacryocystitis cured by canaliculonasal route.*
8. *The rationale of the eye affections due to sinus disease, based upon the study of the surgical pathology of the accessory sinuses.*

1. (*a*) *Irritation of Labyrinth From Eyes.*—We are all familiar with the ordinary symptoms of dizziness, vertigo, nausea and vomiting in connection with a marked refractive error, but as this case is so marked and as there was a spontaneous nystagmus present, I desire to bring it before you.

Mr. H., aged thirty-three years. Complains of frontal headaches, much dizziness, vertigo, nausea, vomiting, and of his eyes getting tired very easily, especially after reading. He is a business man and is compelled to leave his office owing to these symptoms, which are increasing in frequency. He has had some trouble in breathing through his nose and has had hay fever, but this has disappeared for the past three years without treatment.

Examination.—Well nourished man, with negative physical examination, even by laboratory methods, made by a competent internist. Nose, some hypertrophic rhinitis with deviated septum. Throat, enlarged tonsils. Ears, negative, including functional tests. Eyes, right and left, 20/20 vision.

During one of these spells I found a bilateral spontaneous compound nystagmus that lasted until he was over his dizzy attack.

Under cycloplegic, vision right eye = 20/70; left eye = 20/100.

With correction, right + 1.75 cyl. ax. 45° combined with — 0.75 cyl. ax. 115°, and left + 2.25 cyl. ax. 60° combined with — 0.50 cyl. ax. 120° his vision is: Right 20/30, left 20/40. Ophthalmoscopy negative. Muscles, no marked change.

The full correction was prescribed, and he has been wearing it ever since, now nine years, with perfect comfort. At one time he broke his lenses and after two days without them, all his symptoms returned. He was relieved almost instantly on putting on his glasses. I have repeated this experiment by allowing him to take his glasses off for a few hours. The interesting point to me is the production of the spontaneous nystagmus by taking off his glasses, and the inability of its production when he wears them.

(b) *Irritation of the eyes (especially dimness of vision and inability to get proper correction) from an affected labyrinth and middle ear.*—Mr. Van D., aged fifty-two years. Cannot see well to read, in spite of repeated refractions and prescribing of lenses by various oculists. Also complains some of a full feeling in the ears, does not hear well and has noises in ears and head. At times he is dizzy. These ear symptoms are, however, not mentioned as causing much trouble.

Examination.—Man, weighing over two hundred and fifty pounds, with a high systolic blood pressure, 190-210, never the same. Physical examination was made by an expert, whose diagnosis was arteriosclerosis. Nose, chronic intumescence of all the turbinates. Throat, much relaxed and thickened mucous membrane. Ears, the tympanic membrane dull, with a black line running horizontally through its middle. This line changes its position when the head is tilted backwards or forwards. On having his eustachian tube catheterized while examining with a Siegle otoscope, one sees the dispersion of this black line and hears a marked bubbling while listening with the auscultation tube. The hearing is reduced in both the upper and lower tone limits. There is a spontaneous nystagmus present, although not as marked as the previously reported case.

Eyes, V. R., 20/70. V. L., 20/70. With a + 1.75 S. V. R., 20/50. V. L., 20/50, not distinctly. Jaeger, larger letters; with + 3.25 some improvement, but not distinctly. Anterior segment of eyes negative. Ophthalmoscopic examination negative.

After inflation the ear symptoms are much improved and patient states unsolicited that he sees clearer. Refraction at this time shows he can see with same correction, + 1.75 S., 20/30 + and clearer, and with the + 3.25 he sees newspaper print. This improvement was always only transitory until I opened the tympanic membrane by actual cautery, so that it should not close up again, which always occurred when only incised with a knife. After this his vision remained more or less clear all the time.

It stands to reason that his general condition was also taken care of by his medical man. I have not seen this man in nine years until today, and find him in excellent condition, although his vision and hearing are not so good as they were.

Summary.—I have seen a fair number of these cases, all differing some in their symptomatology, but responding very well to rational treatment. The point to bring out is "what is the connection between the eyes and the labyrinth." We all know about the connection between the vestibular part of the labyrinth and the extrinsic muscles of the eye producing nystagmus, but this is different. There has been some work done along this line by Peters of Rostock, but I will not touch upon it now, leaving it for the discussion of Dr. H. Gradle, who first called my attention to this subject several years ago.

2. *Ethmosphenoiditis with Orbital Cellulitis Simulating Cavernous Sinus Thrombosis.*—It is not at all uncommon to find in the course of a fulminating nasal accessory sinus disease a perforation into the periorbital cellular tissue or an abscess, and there are cases of cavernous sinus thrombosis on record secondary to nasal infection, but they are comparatively rare. This case is interesting because of the differential diagnosis.

A boy, four years of age, had a violent acute rhinitis which did not clear up on the right side, but continued to suppurate. On the tenth day of the disease the rhinologist in charge was called to the house of the patient, to find a very sick boy, who had had a severe chill and temperature of 104°. The right eye was slightly puffed. The child continued to complain of severe headache. I saw the patient the next day, after he had traveled all night and had not slept on account of severe pain. This Lumiere colored and ordinary stereoscopic photograph (Figure 1) shows the appearance of the patient at that time, and it will be noted that there is a marked edema of both lids of the right eye, particularly the upper. The examination of the nose, right side, showed almost a complete blocking by edematous tissue, and pus discharge. The left side of nose was negative. The throat was negative except some postnasal discharge. Slightly enlarged tonsils.

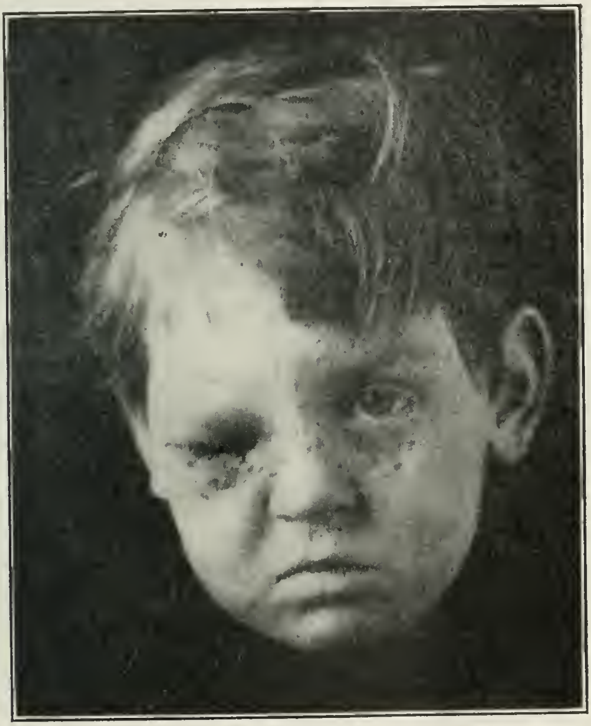

FIGURE 1.

Ears negative. Temperature, 102°; pulse, 130.

Eyes. V. R., 20/20; V. L., 20/20. Right eye, anterior segment, slight chemosis of the conjunctiva, iris negative, and the ophthalmoscopic examination revealed a distinct tortuosity of the veins. The tension was normal and the movements were somewhat restricted. The left eye was practically normal. Blood examination revealed a leucocytosis of a grave sepsis, 32,000, with a polynuclear count of eighty-two per cent. Blood cultures, however, were negative.

The bacteria from the nasal secretions were a predominating pneumococcus and a fair proportion of streptococcus mucosus capsulatus, with some staphylococci.

A roentgenogram (Figure 2) showed a cloudy ethmoid and antrum on right side, but no frontals present. The diagnosis of a cellulitis of the orbit with probably abscess formation secondary to a nasal accessory sinus disease was made, and operation was decided upon. Under general anesthesia I made an exploration of the nasal wall of the orbit from beginning to end, but found no pus or point of perforation. I drained this area. The swelling of the lid as well as the tortuosity of the veins in the fundus oculi went down. On the second day after the operation, an abscess pointed near the external part of the upper lid, which when incised discharged a very large amount of thick pus, whose organisms were the streptococcus mucosus capsulatus and pneumococcus. Following this opening of the abscess, complete recovery took place very rapidly. The blood picture was very interesting, in that even after the first incision was made, the leucocyte count remained up beyond 25,000, but as soon as the abscess was evacuated it became normal. It was the chill, high leucocyte count and apparent choked disc with the severe headache that made one think that the condition might be one of cavernous sinus thrombosis. The external appearance of the eye certainly suggested such a diagnosis.

3. *Infected Ethmoidal Cyst With Periodic Exophthalmos.*—This condition is not found very frequently so far as my perusal of the ophthalmic literature informs me. The patient, a young woman, twenty years of age, had been having headaches over the left eye for a year or more, when she consulted a rhinologist. She also stated that he left eye popped out at times. These periods were usually at or just before her menses, and whenever she became excited or very tired. The

rhinologist could find no reason for this trouble in the nose, so referred the patient to an ophthalmologist, who found the eyes negative. An X-ray picture showed some evidence of trouble in the ethmofrontal region, but it was very indefinite. With this history the patient was referred to me, and I found precisely the condition as described above. Since the head

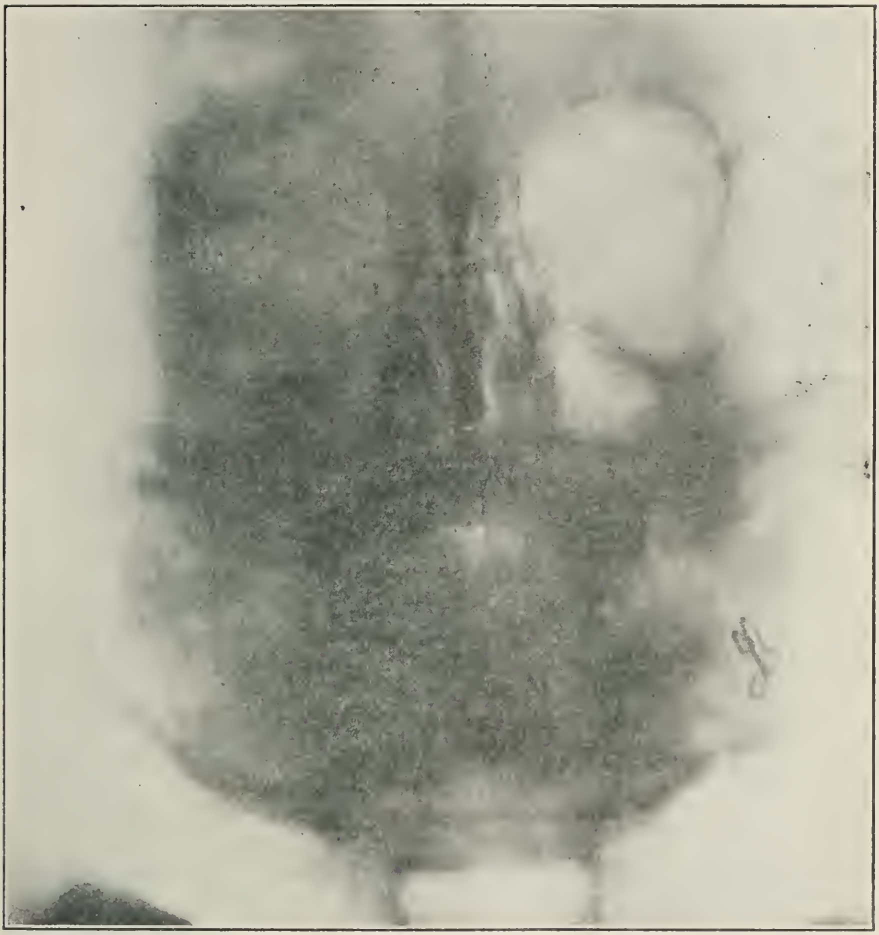

FIGURE 2.

and eye pains were increasing in frequency I decided to do an exploration of the left orbit. Up to this time I had never seen any evidence of exophthalmos. While the patient was being anesthetized—in fact, she was already under—the anesthetist called my attention to the disproportion in the two eyes, she (the anesthetist) not knowing anything about the history of the case. I found a very marked left sided exophthalmos, and on palpation could feel as I never had before a resistant body on the nasal side of the orbit. When pressure was exerted on this resistant body it would give way, but recoil immediately on taking off the pressure. I now made a diagnosis of a possibility of an orbital tumor of an angiomatous type. On making an incision down on the tumor, I opened into a large cavity from which there was evacuated a large amount of pus, of a seropurulent character. The culture made from it proved subsequently to be almost pure pneumococcus, but of a very slow growth. A drain was placed into the depth of the wound and instructions were given to change the external dressing frequently during the next few hours, owing to the great amount of the discharge. The upper and lower lids were held together by a silk stitch for twenty-four hours, a procedure I follow in all my cases of operation in the vicinity of the orbit, thus protecting the cornea from infection and trauma. This stitch of course is placed before operation is begun. After about ten days of this drainage, I found a large cavity representing the complete disappearance of the anterior and posterior ethmoidal cells from the lacrimal bone anteriorly to the sphenoidal sinus posteriorly, including the nasoorbital plate or lamina papyracea. The periosteum of the orbit on the nasal side corresponding to this defect was very much thickened; it represented part of the cyst-abscess wall. The shell of bone representing the nasal boundary of the cyst was of considerable thickness, and would not break easily on pressure with a probe. By means of an ethmoidal punch forceps, I entered this bony cyst wall from under the middle turbinal and removed it entirely, leaving perfect drainage. The external opening was allowed to close, which occurred promptly. In passing, I might say that since the infection was pneumococcal, we applied optochin to the nose and cyst, as well as to the eye, and it appeared to influence the healing somewhat. It is four months since I saw the case, and today I find her perfectly well, as you can observe.

Dr. Gradle saw this case and will, I hope, speak about the negative findings of the fundus, the normal vision and normal muscular movements, facts hard to reconcile with such a marked disturbance in the vicinity of the vital structures. My own explanation is that the slowness of the process in a low grade inflammation, with the formation of the thick periosteum, which acted like a bony covering, are responsible for the protection of the eye.

4. *Recurrent Unilateral Iritis of Eighteen Years' Duration. —What Is the Cause?*—These conditions are of considerable interest to all of us, and constantly a subject for discussion, owing to their intractability and failure to cure in so many instances. The greatest trouble is to find the cause. Since the enthusiasm of the chronic focal infections from the tonsils, teeth and nasal accessory cavities has reached a point where its importance is often overestimated, the intestinal, gonorrheal and luetic etiologic factors of this condition have fallen somewhat in the background and, I believe, to the detriment of the patient and science. Permit me to explain this latter statement by very briefly recapitulating this patient's attempts to get well from this most disagreeable and at this time distressing condition, because very recently he had a light attack in his good eye.

Twenty years ago, at the age of twenty-three, I first saw the patient with a knee joint affection on one side, which required tapping. It was considered traumatic because he had fallen on the ice, although he had had a gonorrhea one year before, from which he recovered within three weeks. Nineteen years ago he developed a lipoma on his back, which was removed. Seventeen years ago he had his first attack of iritis in the right eye, from which he recovered in two weeks under salicylates and atropin treatment. He had a sore throat and some rheumatism preceding this attack. After this he had several similar attacks within a year, and associated with them definite gastric disturbances, as loss of appetite, anorexia and bilious appearance of his skin. He decided to go to Carlsbad, and while there consulted Dr. Albert, ophthalmologist, who treated an attack on the basis of an intestinal infection. Shortly after, about sixteen years ago, he consulted Prof Fuchs, of Vienna, who advised strict dietary measures. Fifteen years ago, after several more attacks, he consulted the well-known celebrity of Milwaukee, who performed an iridectomy with no permanent result. I saw him in the next few attacks. He then left me and consulted Dr. A——, member of this society, who treated him during several attacks by the accepted methods. At this time the attacks were more severe and lasted longer. All along he has had some of the best internists to take care of his general condition along the line suggested by Prof. Fuchs. He now consulted Dr. F——, a member of this society, who saw the first hypopyon in this case. After suffering several attacks, he left Dr. F—— and again returned to me. I began to investigate the possibility of the cause being located in the tonsils, sinuses and teeth, but could find no evidence of any definite disease there. He then returned to Dr. A——, who told him the best thing to do was to have that eye taken out. This frightened him, and he returned to me during the following attack, when I noted a distinct tonsillar infection, also evidences of an ethmoidal congestion on the same side as the eye affection. On his way to Bermuda, following this severe attack, I had him consult Dr. Christian Holmes of Cincinnati. After a very careful study of my history of the case, X-ray pictures, and physical examination, including a Wassermann and tuberculosis complement fixation test which were negative, and his own thorough examination, Dr. Holmes concluded it was his antrum of Highmore, although he did not puncture it, that was responsible for the eye trouble. There followed several more attacks, one more severe than another. He again consulted another ophthalmologist, Dr. H——, member of this society, who gave him a good prognosis after a urinalysis, but his treatment, based upon the uric acid theory, was of no more avail than the others. At this time the patient took a trip east, and while there I had him see Dr. Yankauer, who diagnosed antrum trouble, puncturing and washing it out. The fluid was found to be clear. The patient further consulted Drs. Posey and de Schweinitz. Dr. Posey thought of a possibility of making a complement fixation for gonorrhea, and Dr. de Schweinitz said it was some focus of infection, but would not venture to say where it was located. On his return to Chicago I went over him again with his medical man, Dr. N. S. Davis, and his dentist, who, by the way, had been examining the teeth right along as to the possibility of the trouble being located in and about them. All suspected areas of the teeth were attended to, but the X-ray pictures of them were of very little value. After this consultation I concluded to remove his tonsils and make a vaccin from them for the follow-up treatment. A thorough tonsillectomy was, therefore, performed, two years ago, and an autogenous vaccin of a streptococcus hemolyticus was given several weeks after operation. For eleven months after this procedure he had no attack and felt better than he had for many years. At the end of this time he had another light attack, and this was followed very soon, sooner than formerly, by another more severe one. This condition repeated itself, and so he now consulted another ophthalmologist, Dr. G——, a member of this society, during the next attack. This particular attack lasted longer than any previous one. After several weeks' sojourn in Florida he returned feeling much improved in general health, but after about two weeks in the city he developed a very light attack, however, in the left or healthy eye. This alarmed him, fearing that he might have the same trouble in his good eye. He again consulted me about it, and that is one of the reasons that I am presenting him to you for your consideration. I have had a good many cases of iritis in which the chronic focus of infection was suspected in the tonsils, teeth and sinuses or external or middle ears, with a very fair result of cures or very beneficial influence on the iritis, but there are several cases that I have in mind that did not improve, and I have the knowledge of one case which followed tonsillectomy which went from bad to worse, finally almost losing the vision in that eye.

Note.—Since the above report the patient has had a violent attack of iritis in the good eye, since which time he has passed from my observation.

5. *Nonsuppurative Sinuitis Causing Blindness (Diffuse Edema of the Retina); Operation With Complete Recovery of Vision.*—The literature is full of case reports on this subject, but I must confess that this is the only striking case I have in which operation on the nasal accessory sinuses appeared to bring about such marvelous results. In not less than twenty cases of marked reduction in vision, in which a diagnosis of retrobulbar neuritis due to nasal accessory sinus disease, whether suppurative or not, was made, and in which I operated as thoroughly as I knew how, I have failed to improve the vision one particle. This lady, thirty years old, gave the his-

tory of having had la grippe, and noticed about six weeks later that her eyesight began to fail. Went to her oculist, who made an examination and found the vision reduced to 2/200 in right eye, but about 20/70 in left. The nose showed evidence of nonsuppurative sinuitis and deflected septum high up anteriorly. The fundus examination showed slight tortuosity of the vessels. He had her come back the next day or two, and found that she had to be led into his office. The vision was worse in the right and almost as bad in the left eye. He immediately took the train with the patient, and his examination was verified by me. An X-ray of the sinuses showed a typical rarefaction of the ethmoidal labyrinth. She was also seen by Dr. B——, member of this society, who stated to me over the telephone that there was unmistakable evidence of retinitis with tortuosity of the blood vessels, particularly in the right eye. The blind spot was not enlarged. There was some pain in movement of eyeball suddenly and in a certain direction.

A thorough physical and blood examination, excepting Wassermann, which could not be completed in time, was made and found negative. Operation on sinuses advised. Under local anesthesia a submucous resection was performed and complete exenteration of the ethmoid cells with middle turbinectomy and exploration of frontal, antral and sphenoidal sinuses. The following morning patient declared she saw more clearly, and the vision rapidly improved, so that six weeks later her ophthalmologist sent in the following report: Vision right eye, 20/30; left eye, 20/30 plus 1. And a subsequent letter, two months later, stated that her vision was normal. The Wassermann in the case was negative.

6. *Tumor of the Hypophysis, Complicated; Postmortem Findings.*—The otolaryngologist and ophthalmologist are intimately associated in these cases, as are the neurologist and laboratory technician. The latter are concerned principally in the diagnosis, whereas the otolaryngologist has to do with the surgical treatment, since the transnasal route has given the best results. In this connection I desire to describe briefly, at the conclusion of this case report, a modification of the Hirsch's transnasal method which I have practiced successfully in two cases.

The history of this case is so interesting that I shall go somewhat into detail in its citation. A man, seventy-one years old, presented himself with the complaint of considerable difficulty in breathing through the throat and marked headache and dizziness. He also stated that his voice had changed a great deal. He furthermore stated that his hands, feet and face had within the last year become very much larger—twice the size—(Figure 3), and his sight had gone back on him.

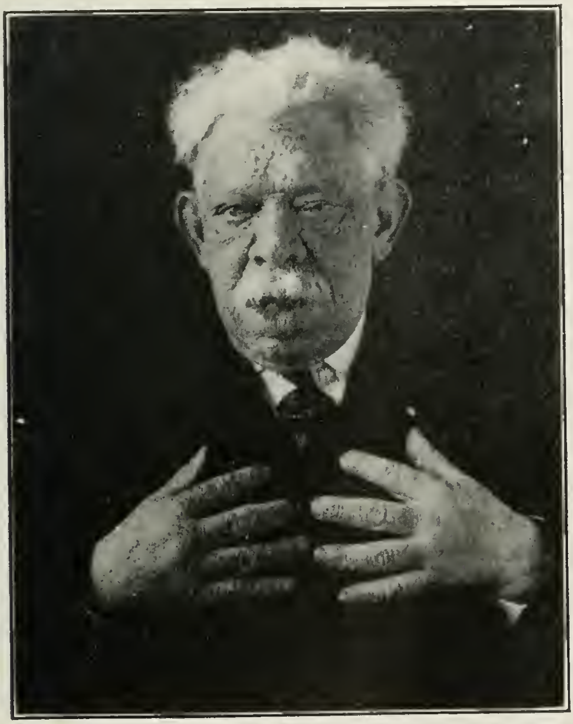

FIGURE 3.

His left eye was never any good since he had smallpox when a boy, which left a white spot on the cornea. He has had two operations in the last thirty years of his life. In one a growth was removed from the front of his neck (probably a thyroid gland), and seven years ago a swelling appeared at the back of his tongue, said to have been a tumor (probably a lingual or internal thyroid). He and his family noted that following the removal of this tumor inside of his throat his whole nature and mental condition changed, also the skin became harder to the touch. Insofar as the infant and childhood and early adolescence as well as the family history is concerned, there is nothing worth mentioning either as to habit or venereal history.

Examination.—1. External or Cutaneous.—Heavy set man of short stature, with prominent supraorbital margins, large cheek bones and lower jaw, a large nose and enormous sized lips, the lower hanging over half of the chin. The ears are large and projecting forwards. The skin thick and pock marked. The neck is not very thick, and shows the scar in the region of the middle lobe of a thyroid or a thyroglossal duct cyst. The arms are not unusually large, but the hands, and particularly the fingers, are out of all proportion in size to the arms. There is hair under the arms, and the scalp and face have a very luxuriant growth, very hard to the touch. Nothing unusual externally about the chest or abdomen. The sexual organs appear normal, although in questioning as to function, patient stated that he has been impotent for the last thirty-five years. The legs appear normal and have considerable hair on them. The feet, however, show marked enlargement, especially the toes.

2. Internal or Medical, Including Neurologic, and Some Laboratory Findings.—(1) Somewhat slow in cerebration in answer to very simple questions. The lungs are negative with a tendency to hyperresonance. The heart shows some enlargement of the left side and aortic region. There is no evidence of any valvular lesion. Blood pressure, 120 in systole and 90 in diastole. The roentgenogram verifies these heart and lung findings. The abdominal contents are negative. Urine analysis shows a trace of albumin, and, microscopically, there are a few granular and hyalin casts present. Blood examination shows practically a normal picture. The Wassermann reaction is negative. Sensation and all reflexes are normal. The X-ray picture of the sella turcica (Figure 4) shows definitely an enlargement.

(2) Ophthalmologic findings.—Vision left eye, fingers; cannot be improved. Right eye, 20/70, with + 2.00 S., 20/30. Close vision, large type; with + 4.75 S., newspaper print in

right. Left, impossible to read with. External examination: Left eye has a fairly dense central opacity. Right eye very shallow anterior chamber. Ophthalmoscopic examination is useless in the left eye. The right is negative, or possibly a suggestion of a tortuosity of the vessels; no evidence of any atrophic changes about the disc. Perimetric examination shows a positive narrowing of the temporal field in both eyes; the left eye more difficult to make the test, on account of the scar on the cornea. The tension with Gradle's tonometer is normal in both eyes. Muscle balance all right. Compound spontaneous nystagmus.

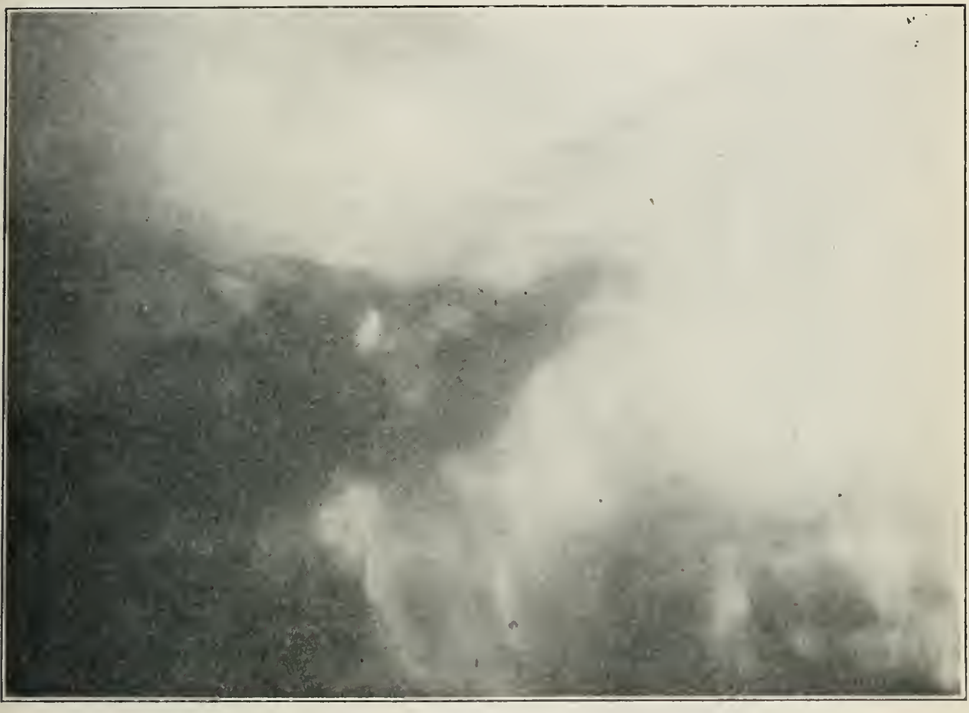

FIGURE 4.

(3) Otolaryngologic findings.—Nose: Very large middle and inferior turbinated bodies, and the mucous membrane of the septum appears very thick, but there is not any evidence

of inflammation. The teeth are in a very bad condition of decay. The tongue is very large and shows the indentations from the teeth by decubitus. Oropharynx: The uvula and mucous membrane of the soft palate are very much thickened and apparently relaxed. There are practically no tonsils or any other lymphoid tissue present. Larynx: Here one of the most interesting and unusual conditions was found, namely, a mass of hypertrophic mucous membrane between the arytenoids, which were themselves much enlarged. This membrane would flap and fall into the larynx with inspiration, especially when prone on his back, thus causing a great deal of difficulty in breathing and speaking. An X-ray of the larynx shows considerable thickening of the thyroid, cricoid and arytenoid cartilages. The vocal cords appeared to be normal. Ears: No evidence of any pathologic changes in canal or drum membrane. Test of hearing: Slight elevation in the lower tone limit, and whisper not heard any farther than five feet. Bone conduction with Rinne fork, forty-five seconds.

The diagnosis of a tumor of the hypophysis was made, and a test was made as to sugar tolerance, so as to determine if possible which portion of the hypophysis was involved. He consumed as much sugar as any normal individual without producing any acetonemia or sugar in the urine.

I now decided to present him to the Chicago Oto-Laryngological Society, with particular reference to the possible removal of the hypertrophic mass about his larynx. This operation was performed under cocain anesthesia by means of the suspension laryngoscopic method. By grasping the mass with a volsellum forceps and putting a cold wire snare over it, several small masses were taken off for microscopic examination. This gave immediate relief as to breathing and speaking. The patient had some difficulty in swallowing after this procedure; in fact, I ordered rectal feeding for him. Everything went on beautifully for about two weeks, when one morning he did not get up as usual, but appeared to be deeply sleeping. Examination revealed the symptoms of a comatose condition, like a uremia or brain hemorrhage in the region of the vital centers. Within six hours he had a most peculiar phenomenon of Cheyne-Stokes breathing. He could be roused between attacks, take a drink of water or milk; in fact, at one time he got out of bed and walked across the room, only to sink to the floor into another attack of very slow, and superficial breathing. He died within twelve hours from the time this latter change was first observed.

Postmortem Examination.—Six and one-half hours after death there was no evidence of rigor mortis. Section of the scalp showed it to be enormously thick, nearly three-fourths of an inch, over the vertex. The bleeding was very free, and the blood would not coagulate. The calvarium was not unusually thickened, but the bleeding from the diploe was unusually great. The dura and the rest of the meninges were about normal, except for the free bleeding and no tendency towards coagulation. The brain did not show any gross changes on its surfaces. (It was put in hardening fluid for further examination.) In the region of the sella turcica a tumor was found the size of a hazel nut, reaching above the posterior clinoid processes, and it was very soft in consistency. A smear was made of it for immediate examination, and it showed the characteristic epithelial cells of the anterior lobe of the hypophysis. The enlarged sella was filled out by the same type of gland, which was removed and saved for future microscopic examination. The posterior clinoid processes and the neighboring bone appeared to be of a deep red color and soft. This bone was resected and saved for further microscopic examination. The bottom of the sella appeared to be intact, but readily broken through into the sphenoid sinus, the latter appearing to be normal. The roof of one of the orbits was taken off, and the optic commissure with the optic nerve and the posterior pole of the eyeball were taken away for further microscopic study. The rest of the cranial nerves appeared to be normal. All through the examination large quantities of blood interfered with the work, and this blood refused to clot. A large amount of this blood was saved for further study. The remaining portions of the body were not autopsied, as per request of the family. This fact is the weak point in the case, but I was glad to be allowed to make an autopsy of the intracranial structures.

A death certificate of tumor of the hypophysis with secondary congestion and pressure of the brain was issued. The subsequent examination of the parts preserved revealed the following:

The blood shows deficiency in calcium from 11 grams to 9.071 grams.

The brain, negative.

The tumor, hyperplasia of cells of anterior lobe.

The bone showed pressure atrophy.

The optic commissure and optic nerve, negative.

The posterior pole of the eye, negative.

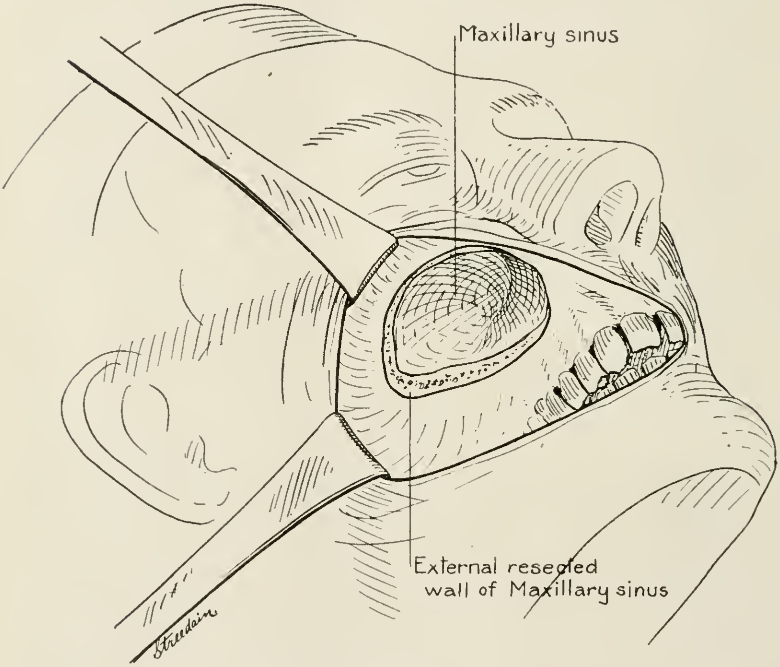

FIGURE 5.

First Step.

The masses removed from the larynx antemortem showed hyperplasia of mucosa.

This case shows the intimate relation of the various branches, but, as stated before, the rhinologist is particularly concerned in the surgical tretament. We decided in the beginning that this patient was too old to stand the operation on the hypophysis, but had we performed one, it would have been by the technic which I have developed and practiced in two other cases and which is briefly described as follows:

1. Incision is made above the gingival margin about one-fourth of an inch, in the soft tissue of the upper lip, beginning in the median line above the second central incisor, and carried externally to the first molar.

2. The soft tissues are severed and the anterior surfaces of the superior maxilla exposed in the same manner as when opening the antrum.

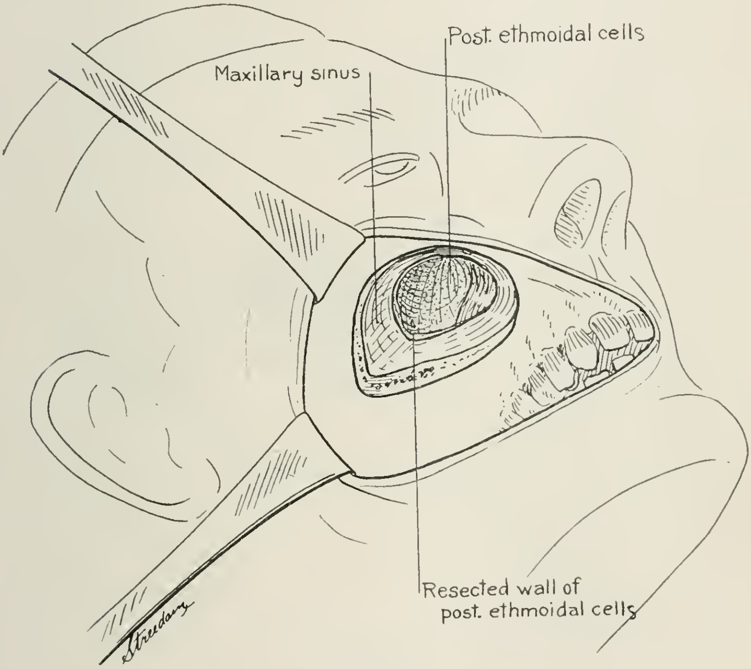

FIGURE 6.

Second Step.

3. Elevation of all the tissues as far as the inferior orbital margin and laterally to the zygomatic fossa.

4. Retractors pull upwards and forwards (mouth closed) so as to expose the entire anterior surface of the antrum, (Figure 5.)

5. By means of an electric burr or biting forceps the entire anterior surface of the superior maxilla is taken off. The infraorbital nerve is not injured in the procedure. (Figure 6.)

6. The antrum is now packed to prevent the accumulation of blood.

7. The middle turbinate is now removed and nose packed with gauze.

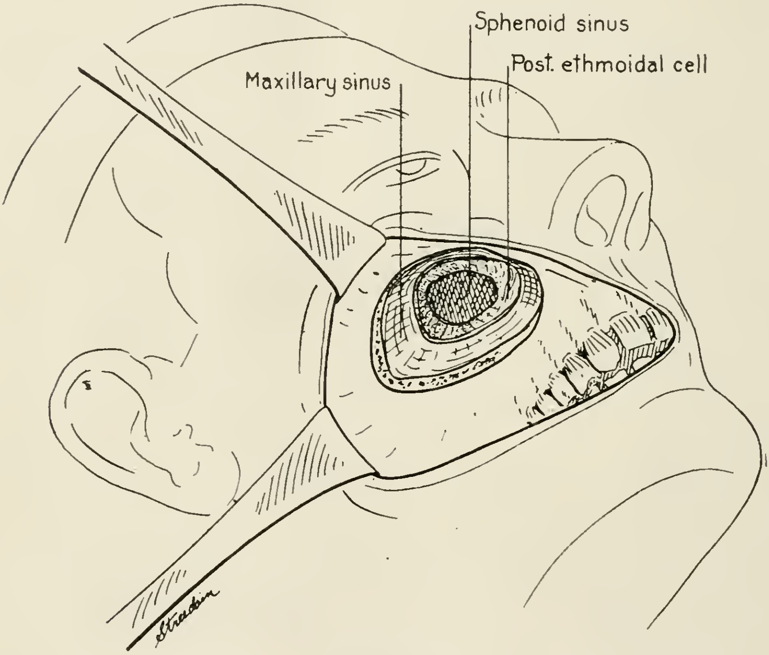

FIGURE 7.

Third Step.

8. The gauze is now removed from the antrum, and the posterior ethmoidal region is opened through the antrum by means of curette and nasal punch forceps, and the posterior ethmoidal cells curetted until the gauze packing is reached within the nasal cavity. (Figure 7.)

9. The nasal packing is removed and a probe inserted into the sphenoid sinus as a guide.

10. The gauze is removed from the antrum, and the anterior wall of the sphenoid is removed in the usual manner by curettes and punches. The septum between the two sphenoid sinuses should also be removed.

11. By means of Hirsh's beveled chisel, three incisions are made into the floor of the sella turcica, and this little piece of bone lifted off by the same chisel and removed by breaking it off from its attachment. (Figure 8.)

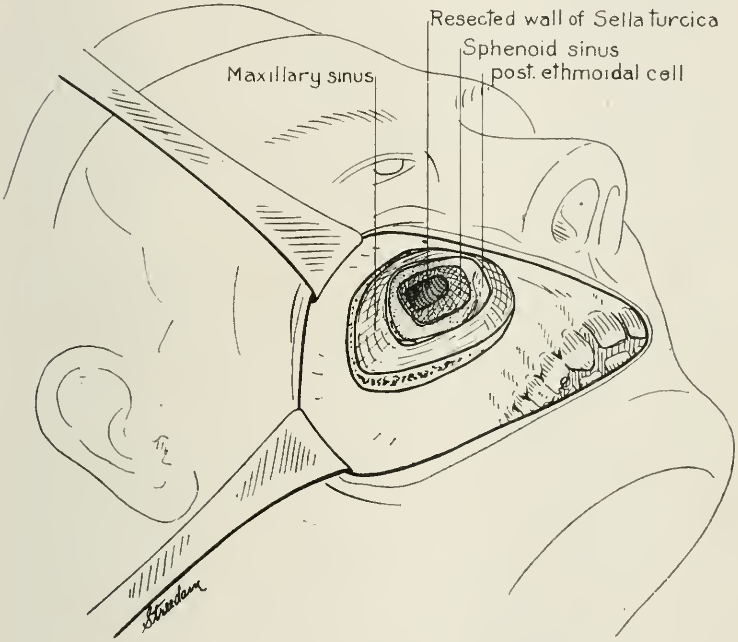

Figure 8.

Fourth Step.

12. By means of the two angular spatulas of Hirsh, small particles of the thinned out floor of the sella turcica are removed, and the opening further enlarged by sphenoid punches.

13. The dura is now incised with Hirsh's bistoury, and any desired incision made to enlarge the opening by the same instrument. If the growth is a cyst, then that will probably terminate the operative procedure; but if it is a tumor, then the same or part of it is removed by punches and curettes.

14. A cigarette drain is placed into the sella turcica and led through the antrum under the upper lip. After twenty-four hours the drain is removed.

7. *Tear Duct Operation.*—Having performed a fair number of tear duct operations by the classic external resection, as well as by the procedures of Gifford and Toti, Yankauer, West and the modifications by J. Sheldon Clark, and Pratt, by way of the nose, I believe I am in a position to discuss their comparative values.

There is no question that a thoroughly well performed tear sac resection leaves nothing to wish for in the ultimate result, and a cure in the majority of instances is obtained. Yet it must be admitted that many cases still cause trouble, particularly from the necessity of taking care of excessive tearing and secretions which are bound to occur at times. It was this difficulty that led to the development of the operations in the nose, and from it to the tear sac.

Toti's operation, by first resecting the middle turbinal and anterior ethmoid cells, and then opening through the tear sac into the nose through this terrain, proved, in my experience, to have fairly good ultimate results, although reopening from the nose, which was always of a trivial character, had to be resorted to when the opening became contracted.

Yankauer's operation, which it was my privilege to have demonstrated to me by the author, is very ingenious but too technical. I performed it twice, employing the instruments and following the author's technic very closely, but the results were not good and the cases had to be reoperated. It is, however, my opinion that with the perfection of this technic, and in case of a large roomy nose, this operative procedure would give the best results, because it simulates closely normal anatomic-physiologic conditions.

West operation. This procedure, from my own experience in a limited number of cases (eight), was followed by the least satisfactory results, which is to be expected, when one considered the small area to work in and the close proximity of the tear sac at the point of attack, as directed by West, to the septum, which in so many instances is quite thick at this point, the tuberculum septi. In fact, if the case is not watched very closely, there may result, and have resulted in cases where there was considerable postoperative reaction, a synechia between the septum and the operated field. This, fortunately, was not the case in my own practice.

The modification of West's operation, as suggested by Dr. J. Sheldon Clark, has some points to recommend the procedure, since his instrumentarium, especially the punch forceps, makes its performance easier. Furthermore, the results obtained by Dr. Clark are good.

There are certain cases that are practically impossible to operate by way of the nose, and consequently these would have to be done by the external resection method. Three such cases presented themselves to me, and I was forced to develop a technic which would avoid the resection, and which was different in each individual case. One was a case of chronic suppurative dacryocystitis of luetic etiology in an adult, in which there was a cicatricial stenosis of the anterior nares, with marked narrowing of the rest of the nostril. The other two cases were in small children, three and four years old, in whom the nostrils were too small to operate by that route. I presented the report of this technic to the Chicago Ophthalmological Society, in the discussion of Dr. J. Sheldon's Clark's paper about March, 1914. A little later, in 1915, Dr. Pratt of Aurora reported a somewhat similar technic, with no reference to my work. The technic was as follows, in the case of the boy four years old: Under general anesthesia the lower canaliculus was slit as far to the canthus as possible, then a strong but slender dilating artery forceps was passed into the sac and this part dilated forcibly. A small oval burr (one-eighth inch in its greatest thickness) was passed in, down and somewhat backwards into the sac into the nasal cavity. An opening twice the size of the burr was made and the rough edges found within the nose were trimmed off. As soon as the reaction from the operation disappeared (two days) this created opening was kept large by dilators, employing under local anesthesia (cocain and adrenalin) the largest that could comfortably be passed, and this was repeated every day. The dilator was left in for half an hour at a time. The result from this procedure was a permanent cure after almost a year of dilatation treatment, although there had been suppuration for nearly two years, and attempts at dilatation and washing had been made before in the usual way.

The second procedure that I practiced in two cases with fair success in one and failure in another, was a combined external and intranasal method. A Bowman's probe was passed into the sac, and an incision carefully made into it over the probe. A silk thread was passed through the mucous membrane and skin edges of the incision so as to act as a retractor, thus holding the sac wide open. The probe was withdrawn and an incision made through the sac opposite the external incision—that is, the nasal side of the tear sac. Through this exposure of the bone, an opening about one-eighth of an inch in length was made into the nose by means of a burr. A semifirm oil silk catheter was passed through the opening thus prepared, directing one end towards the canaliculus and allowing the other end to come out near the external naris. The tear sac was now accurately sutured externally and sealed with collodion. This semifirm oil silk catheter was allowed to remain in this position for about a week, washing it out from the canalicular side as well as nasal side by means of a syringe, to prevent any secretions accumulating in it. Subsequent to the removal of this catheter through the nose the newly made channel had to be kept open by dilators passed through the canaliculus for several months.

8. *The Rationale of the Eye Affections Due to Sinus Disease, Based Upon the Study of the Surgical Pathology of the Accessory Sinuses.*—The pathologic anatomy of the nasal accessory sinuses explains most of the symptoms referred to the eyes, and the further study of the surgical pathology can in most instances verify the cause of these symptoms. The positive results on the eye conditions from surgical treatment of these accessory cavities is still another proof of the rational conclusion as to the relationship that exists between the nose and the eyes.

The acute suppurative and nonsuppurative forms of sinuitis and their effect on the ocular structures will, with one exception, not be discussed in this paper, since treatment directed to them is either by expectant, local or nonsurgical measures, and consequently we cannot speak of a surgical pathology in such conditions. The one exception referred to is the acute fulminating type of sinuitis, in which perforation has taken place into the orbit.

The study of the surgical pathology is divided into

(a) Gross or macroscopic.

(b) Histologic or microscopic examinations of
  (1) Middle turbinate body.
  (2) Nasal accessory sinuses—i. e., the antrum, ethmoid, frontal and sphenoid.

(c) Examination of nasal and sinus secretions as to their bacteriologic and chemical character.

ACUTE FULMINATING SINUITIS.

This condition is most frequently secondary to an acute rhinitis and simple sinuitis, often in cases of preexisting chronic sinus disease.

Gross Pathology.—All the mucous membranes of the nasal cavity are violently inflamed, and evidence of acute edema, especially about the anterior end of middle turbinate and the adjacent lateral wall of the nose, are present. The sinuses, either frontal or antrum and ethmoid, show the following changes: the overlying skin and periosteum are edematous and acutely infiltrated, the bone bleeds freely, and as soon as the cavity is opened a flow of secretion escapes under tension. The mucous membrane lining the cavity is markedly thickened and edematous; it bulges through the opening and bleeds very freely. In a good percentage of cases of involvement of the frontal sinus one will find a large bony defect in the floor of this sinus, and infection of the orbit above. The same is the case in the roof of the antrum, in which condition the orbital floor is affected. In the case of the ethmoid, the lateral or internal orbital surface is the one to be involved. In cases of the acute fulminating types which have developed in a preexisting chronic sinuitis, one will frequently find, in addition, the changes characteristic of the latter condition, such as chronic granuloma and polypi, or even an old necrotic bony area and sequestra. What the pathologic condition of the sphenoid sinus is, can be judged only by analogy with the other sinuses, since this cavity is not operated in many instances in the acute fulminating type, although it is the writer's opinion that when it is in this state of inflammation the gravest of ocular lesions may result.

The histologic pathology of the mucous membrane shows marked thickening of the subepithelial structures; the epithelium itself is in a state of cloudy swelling and destroyed in many places. There is a marked engorgement, and some of the venules appear to be thrombotic. This thickened mucous membrane appears to be lifted off from the underlying bone, which is itself in a state of acute osteitis. In several places are areas resembling acute bony necrosis, which is very important in the study of secondary infection of the orbits.

The bacteriologic examinations of the secretion show many varieties of microorganisms; the staphylococcus, micrococcus catarrhalis, streptococcus, pneumococcus, and bacillus influenzæ are found, as mentioned, in frequency and preponderance. Besides, many nonpathogenic varieties of organisms are present.

It is needless to spend any more time in showing how the ocular structures may become involved in this acute process, and the pathologic findings show why the rational means of attacking the resultant eye complications are from the sinuses. The rhinologists admit that when an abscess has once formed in the orbit, it should be attacked at this point and drained in connection with operation on the sinus, usually intranasally, and at some later date.

I desire to dwell more on the surgical pathology of the chronic forms of sinuitis, especially the nonsuppurative form, since it is in this form that we find a larger number of ocular symptoms and diseases caused by the said affection, without the patient recognizing that there is anything very much the matter with his nose. In the suppurative type there are equally as many symptoms referable to the eyes, but the patients are cognizant of a nose trouble—as, for instance, the discharge.

CHRONIC SUPPURATIVE SINUITIS.

Gross Pathology.—The middle turbinated body is in a true state of hypertrophy. The anterior end has a thick puffy mucous membrane, and the bony structure is very much thickened. It is hard to cut unless actual necrosis has already taken place in it. There may or may not be polypi present, and when they are present, they are of a firm consistency. The ethmoidal cells break down easily under the pressure of a curette, and on examination show areas of true granulation formation; occasionally polypi are found there also. The pus is usually of a thick consistency, and may or may not have odor, depending on the extent of retention and bony necrosis; also whether the specific microorganism of fetid ozena is present. The frontal sinus, antrum and sphenoid show thickened mucous membrane lining, and at times polypoid degeneration, although more frequently areas of granulation, under which is located unhealthy bone, a superficial necrosis. Most of the time the bone is very little changed to the naked eye.

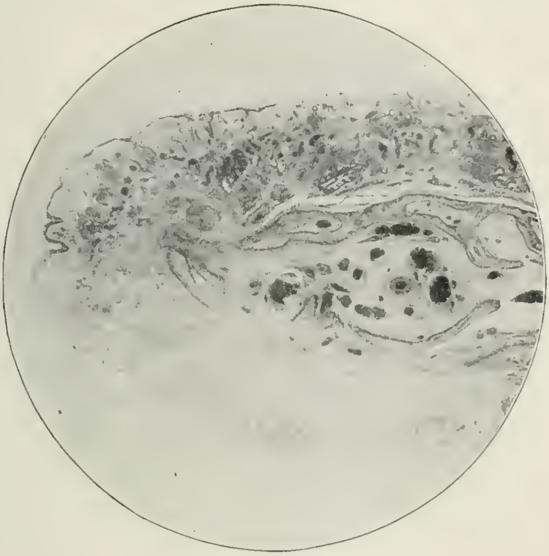

FIGURE 9.

Chronic hypertrophy of the middle turbinal in chronic suppuration of the sinuses.

HISTOLOGIC PATHOLOGY.

Middle turbinal. True hypertrophy and hyperplasia. The glandular elements are fairly well preserved. The epithelium is thickened, the loose areolar tissue is infiltrated with round cells and areas of more chronic inflammatory deposits. The blood vessels are increased, and some of the veins are quite large. The bone itself is increased, and areas of osteitis proliferans are found everywhere. Sections of the most anterior end show areas of myxomatous degeneration. (Figure 9.)

Ethmoidal curettements. These show considerable destruction and inflammation of the bone, surrounded by true granulation. There are also areas of true myxomatous degeneration. The epithelium is very much thickened. (Figure 10.)

The polypi are quite fibrous, with a number of blood vessels, and the epithelium is considerably thickened.

The pus in smears and cultures has a large number and many varieties of microorganisms. The staphylococcus predominates in most instances. Sedimentation of the pus and examination under the microscope reveals bone dust in a number of instances.

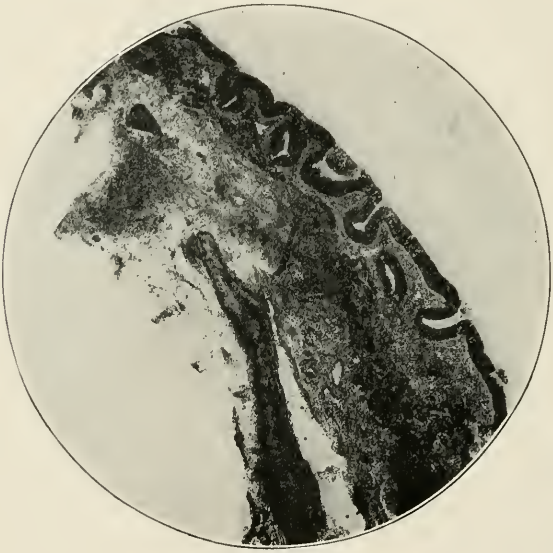

FIGURE 10.

Necrosing ethmoiditis and chronic infiltrated hypertrophy of the mucous membrane.

Mucous membrane of antrum, frontal and sphenoid sinuses is very much thickened by connective tissue; the epithelium has lost its normal characteristics. There are many new-formed blood vessels, and a considerable amount of round cell infiltration. (Figure 12.)

The bone is but very little involved in the inflammatory process, as a rule.

From this statement of facts we will argue that any effect on the ocular structures is probably caused by the chronic engorgement of the blood vessels, which anastomose with those of the eye, and also by the pressure of this chronic overgrown tissue on the nerves, which also communicate with the nerves of the eye, and thus many of the symptoms may be explained. That by continuity of structure the inflammatory process can and does extend to the orbit and beyond it, and press or inflame the ocular structures, is also very clear, and this explains certain definite ocular changes, such as retrobulbar neuritis, abscess, etc. As to the lymphatic distribution between the eye and nose, there are some new and interesting observations recorded which may play an important part in the causation of eye symptoms due to pathologic conditions of the nose.

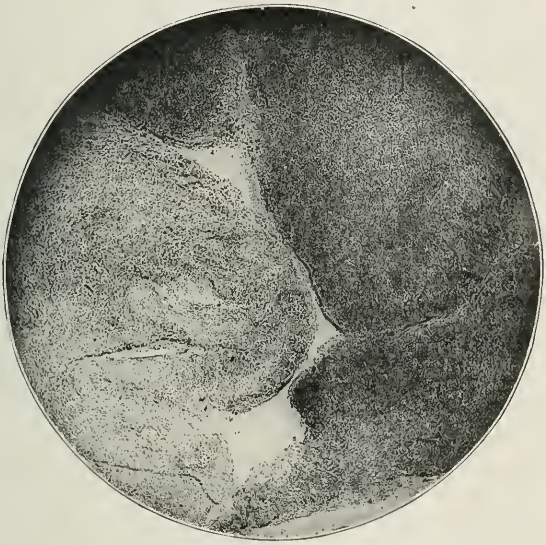

FIGURE 12.

Pyogenic membrane lining the antrum of Highmore in chronic suppuration of all the sinuses.

CHRONIC NONSUPPURATIVE SINUITIS.

Gross Pathology.—The middle turbinal is somewhat enlarged, especially anteriorly. The bone may be large because

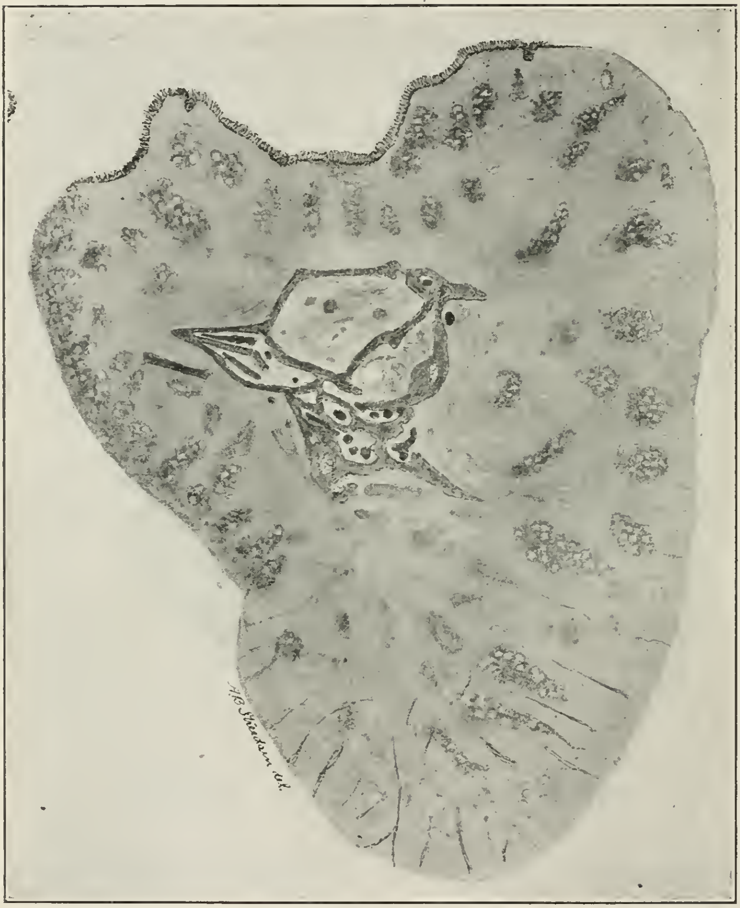

FIGURE 13.

Middle turbinal in nonsuppurative sinuitis.

of rarefaction, and can be easily cut off or crushed. At times the middle turbinal may have, in consequenec of this rarefaction, large cells within it, frequently referred to as bony cysts. There are areas of polypoid degeneration on its under or outer surface. When polypi are present, and they are usually present, hidden under the middle turbinal early, and very manifest within the nose later, they are soft and more grayish in appearance. The ethmoid cells are usually distended with polypi, and many partitions are thus destroyed by pressure. Since the other sinuses, frontal, antrum and sphenoid, are seldom opened in this condition, the pathology is not so well known, except from postmortem examination, and then the changes have been found practically the same, except not so marked, as in the ethmoid. This affection may more correctly be called chronic nonsuppurative ethmoiditis than sinuitis.

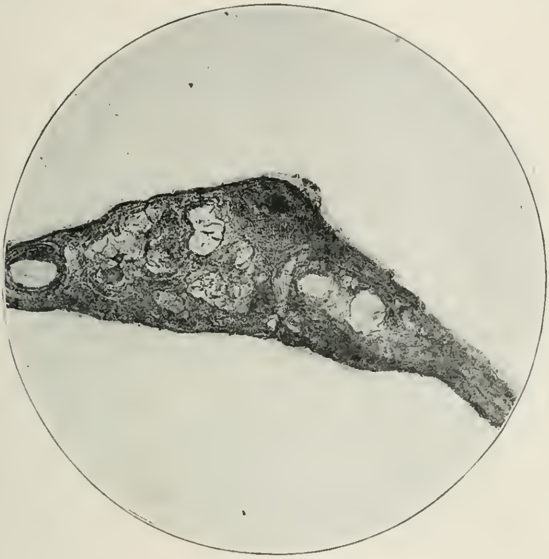

FIGURE 14.

Rarefying osteitis of the ethmoid cell in nonsuppurative sinuitis.

The histologic pathology reveals the middle turbinate thickened by the degenerative process. The epithelium is well preserved and many places show cilia. The underlying structure shows areas of chronic fibrous changes and myxomatous formations. The glands are markedly destroyed. If the bone is increased, it is by the formation of a rarefying process, but there is not much inflammatory reaction. (Figure 13.) The ethmoid cells show the same changes. (Figure 14.) The polypi show more true cystomyxoma (Figure 15) than myxofibroma (Figure 16), in contradistinction to the suppurative form, and seldom are there areas of granulation tissue, although the cell walls may be destroyed, but this is by pressure. The discharge is obtained only periodically, and then is copious and watery. Examination shows very few microorganisms. Chemically, it is highly alkalin.

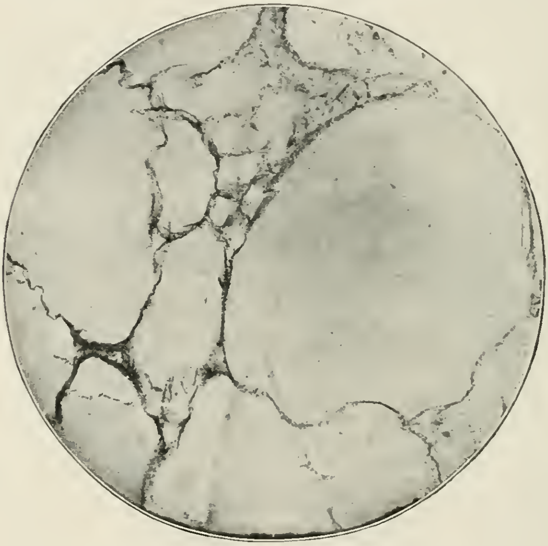

FIGURE 15.

Cystic formation in a nasal polyp in a nonsuppurative sinuitis.

The important point about these changes is the formation of more tissue of a lower type, which causes a pressure especially on the nerves.

These changes will very well explain symptoms of referred irritation in sensory and motor nerves, which cause ocular symptoms. The same is true in the suppurative form, but the pressure is not so great, as a rule. Besides, the chronic suppurative process can extend to the orbital structures also by continuity of tissue causing inflammation of the nerves, muscles, etc. Both suppurative and nonsuppurative forms will obstruct the circulation and explain symptoms caused by these vascular changes.

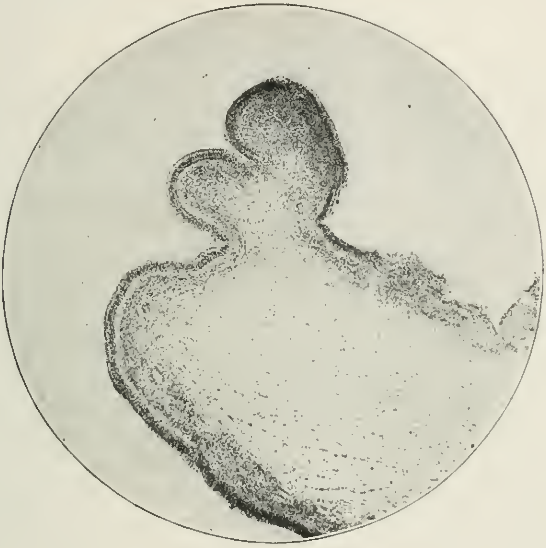

FIGURE 16.

Inflammatory edema and hypertrophy of epithelium of a large solitary nasal polypus in a nonsuppurative sinuitis.

These various microscopic sections illustrated here are picked out from some five hundred different specimens to represent the most frequent changes found.

This then concludes a number of the conditions that the ophthalmologist and the otolaryngologist come in contact with. The earlier one recognizes the needs of such an association the better it will be for both the patient and the doctor.

XXIX.

A CASE OF PITUITARY BODY DISEASE WITH REFERENCE TO THE EFFECTS OF EARLY OPERATION.*

William Evans Bruner, A. M., M. D.,

Cleveland.

There is an extensive literature upon tumors of the pituitary body or in the region of the sella turcica, so that it scarcely seems worth while to record an additional single case, and yet, because of the interesting ocular features which this patient presented at a very early stage, and because of the results of early operation, the case does seem worth reporting. We all occasionally see patients in the late stages of tumors of the pituitary body, with serious visual defects and more or less complete temporal hemianopsia or blindness of one or both eyes. Medical treatment accomplishes little or nothing in the majority of these cases, and it is only within a few years that surgery has been able to do anything for these unfortunates. Now, however, much can be accomplished, not only to alleviate general symptoms, but also—and this is what specially concerns us as oculists—the sight can often be preserved, and when vision is already seriously affected, much improvement can frequently be obtained by operation. It becomes the duty, therefore, of oculists to be more on the lookout for the earliest symptoms of any lesion pressing upon the chiasm, and then not to delay in sending such a patient to a surgeon competent to handle the condition.

Nothing further is needed to confirm these statements than a study of the work done by Dr. Harvey Cushing, and reported conjointly by Dr. Cushing and Dr. Walker.

Without further introduction or comment, the following notes on a case of pituitary disease are presented:

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*Read before the American Ophthalmological Society, Washington, D. C., May, 1916.

Mr. X., aged forty-one years, first consulted me in March, 1909, because of some blurring recently in reading, eyeache and tiring of the eyes after use; vision, O. D. = 6/5 partly; O. S. = 6/5 partly; 0.62 p. p., O. D. 35 c. m.; O. S., 36 c. m.

Ophthalmoscopic examination: O. D., media clear, disc round, physiologic cup, slight scleral ring out, inner edge slightly hazy; retina striated and granular, uncovering of choroid, low H. O. S., the same. Discs are possibly a trifle gray in the deeper layers. Under homatropin

O. D. + 1.00 V. = 6/5.
O. S. + 1.00 V. = 6/5.

He was given +1.25 sphere in each eye for reading.

These glasses were very satisfactory, and in May, 1912 (three years after), he came again with about the same complaint—some effort in reading and occasional slight frontal headache. Without mydriatic,

O. D. + 0.50 V. = 6/5.
O. S. + 0.50 V. = 6/5.

Reading best with +1.75 added, or +2.25 in each eye. This was accordingly ordered. Ophthalmoscopic examination shows the same condition as before—a slight scleral ring in each eye, and discs possibly a trifle gray in the deeper layers. The anterior chambers were normal, tension normal, form fields normal.

In May, 1913, he came, complaining of a little slowness in changing focus; vision with above glass (+.50 sphere) was 6/5 in each eye. He selected the same glass as before for reading. The fundus showed no change. He was given a pair of bifocals. A year later (in April, 1914) he came again, complaining of a little difficulty and slowness in focusing:

O. D. + 0.75s V. = 6/5.
O. S. + 0.75s V. = 6/5.

Ophthalmoscopic examination showed the same appearance as before. The left nerve was possibly a trifle more gray than the right. The form fields were normal, but he was requested to return the next day for a careful test of his color fields. These were found to be practically normal, except for some contraction on the temporal side in the right eye. In

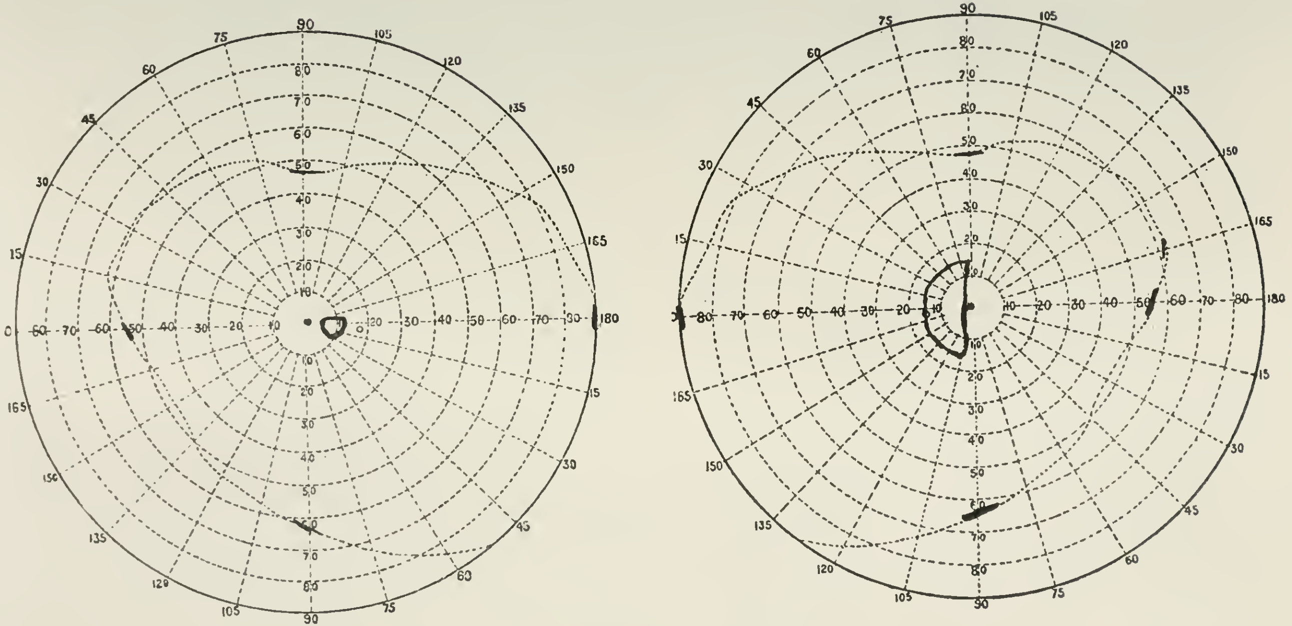
O. D. there was a small scotoma for red, but not for other colors, just beyond fixation out to ten degrees; at the widest portion it extended five degrees or more below the horizontal line. There is no absolute scotoma in this area, but the white spot seems a trifle more hazy. In O. S. there is a similar, though larger scotoma for red, but not for other colors. (See Chart 1.)

The patient does not use tobacco and takes only a very occasional drink of any alcoholic beverage. At times he is annoyed with slight eczema, has chronic constipation, also hemorrhoids and some irritability of the bladder. He occasionally has slight trouble with one ear, has had tonsillitis, though not recently, and the tonsils are rather ragged in appearance. The nose shows a slight hypertrophy of the left inferior turbinate. He considers his general health excellent, has no headache, has occasional slight rheumatic-like twinges; has increased in weight twenty pounds during the past four years.

He was sent to his physician with a report of a probable growth in the sella turcica pressing upon the chiasm, and a thorough general examination was requested, and an X-ray of the skull advised. The general examination was negative, but as the symptoms were so slight, the doctor did not want an X-ray taken as yet, lest it might alarm the patient.

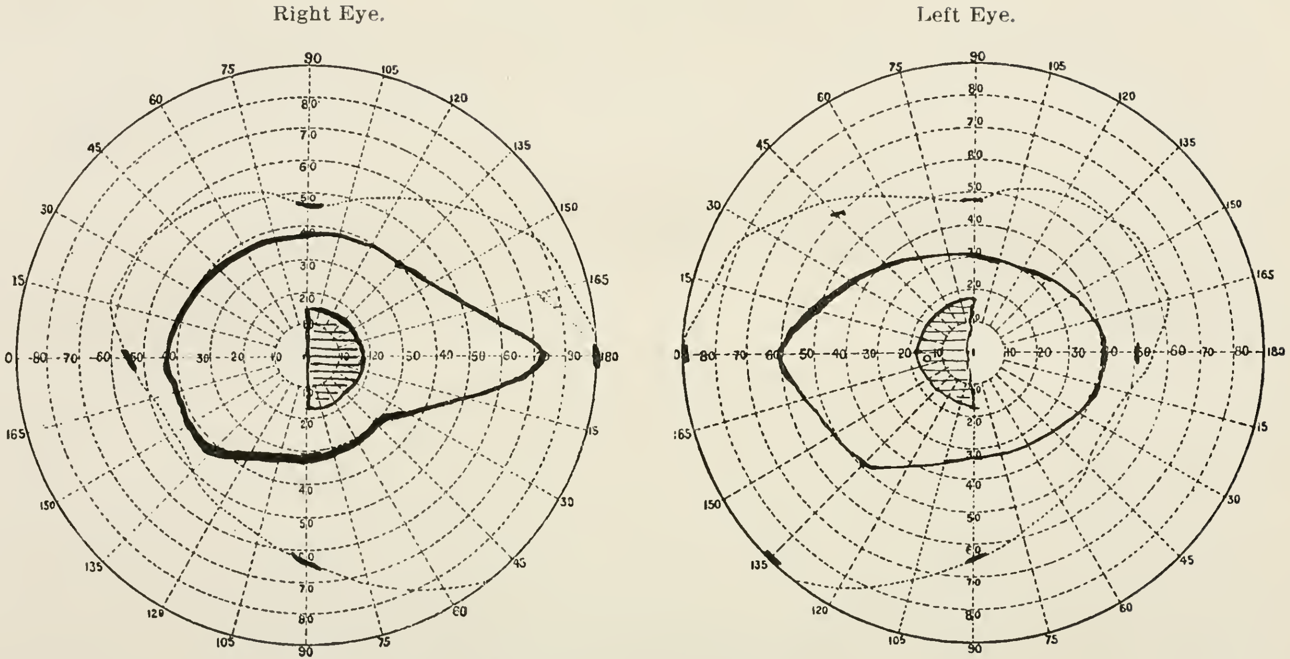
In July (two and one-half months later) he complains that he cannot read or add up a column of figures as rapidly as formerly; he must look directly at an object and requires a strong light to see clearly. With glasses, vision O. D. = 6/5 partly; O. S. = 6/6 partly. The temporal part of each optic nerve is slightly pale, with a faint scleral ring. The fields show the color scotoma for the small red spot larger on the temporal side than formerly. He is unable to recognize it on the temporal side of the vertical line, but can tell it at once when the object is carried to the nasal side. In the area of this color blindness, a small white spot (one and one-half millimeters) is very faint and disappears at points. In O. S. the temporal color scotoma is considerably enlarged.

Examination of the nose and sinuses was again advised, including an X-ray of the latter, and at the same time also an X-ray of the base of the skull, but nothing was done. In October he had not noticed any change in the eyes. With glasses O. D. = 6/6; O. S. = 6/12. With O. D. alone he


Right Eye.

Left Eye.

CHART I.—Scotoma for Red.



Right Eye.

Left Eye.

CHART II.—Scotoma and Field for Red.

reads 0.50 print with difficulty, while with O. S. he reads only 1.75 print with effort. The outer limits of the form field are normal in each eye, but there is now a small absolute scotoma to the temporal side of fixation in each. (See Chart No. 2.)

He was now sent for an examination of the nose and sinuses to Dr. Ingersoll, who reports these structures normal. Drs. Hill and Thomas, who took the radiographs, report the sinuses clear, but stereoscopic plates of the head show the sella turcica to be somewhat deeper than normal at the posterior part, and there appears to be some destruction of the posterior clinoid process, suggesting a tumor of the hypophysis.

A Wassermann was made and found negative. He then went on to see Dr. Harvey Cushing, who confirmed the diagnosis of tumor of the pituitary body. He advised against any immediate operation, but favored watching for several months, and should the symptoms increase, he would then operate to preserve his eyesight. He advised a trial of pituitary extract in the meantime.

In December his condition was about the same. The temporal half of each nerve was rather pale, especially the left. The next month (January, 1915) he again saw Dr. Cushing, who then advised operation. Dr. Walker at this date (January 8, 1915) corroborates the color defects, and reports in addition "Characteristic bitemporal form defects when the disc diameter was decreased below one millimeter."

The following month he returned to Boston and was operated upon by Dr. Cushing in February, 1915. Dr. Cushing reports the operation a transsphenoidal one. He found "a particularly large sphenoidal cell which contained a median division. The exposure of the floor of the sella was particularly satisfactory. It had a rather broad exposure transversely in comparison with the usual narrow transverse exposure. The mucous membrane was removed from the cells, and the floor of the sella was then rongeured away, giving a wide exposure. In pricking the dura a yellow soft struma began to extrude. An opening the size of the thumb nail was made in the dura and many fragments of the struma were removed." His recovery was prompt and satisfactory.

He reported at the office April 7, 1915, about six or seven weeks after the operation; was feeling finely. Can see better than before, and no longer has any trouble with figures. With his glasses, vision O. D. = 6/5; O. S. = 6/5. He readily reads 0.50 print with either eye. Ophthalmoscopic examination shows the nerves about the same; temporal edge of right disc slightly pale, the left more pale with a scleral ring also more marked. The absolute scotomas to the temporal side of fixation have disappeared, while only a small color scotoma at this location remains in each eye.

In October, 1915, eight months after the operation, vision O. D. = 6/5; O. S. = 6/5, but slightly hazy; reads 0.50 readily with each eye. The fundus shows no change; the form fields are normal in each. There is still a small scotoma for red, but not for blue or green, between fixation and the normal blind spot. He is feeling finely and the eyes are giving him no trouble.

On March 29, 1916, he reports by telephone that he is getting along finely. He has recently seen Dr. Walker and Dr Cushing, and was told by them that the eyes are the same or slightly better than last fall. The form field is normal on the temporal side in each eye, and there is no scotoma near fixation, except for color, as before. He is having no difficulty whatever in using his eyes.

XXX.

AN UNUSUALLY LARGE OSTEOMA OF THE FRONTAL, ETHMOIDAL AND SPHENOIDAL SINUSES INVOLVING THE ORBIT AND ANTERIOR CEREBRAL FOSSA, PRESENTING NO SUBJECTIVE SYMPTOMS OTHER THAN PROPTOSIS OF THE EYEBALL.*

C. A. Veasey, M. D.,

Spokane.

Osteoma of the frontal sinus is sufficiently infrequent of itself to warrant the report of isolated cases, and the following history, presenting several unusual features, is herewith submitted:

Mrs. A. B., married, aged thirty years, was brought to consult me on December 1, 1915, because of some proptosis of the right eyeball, which was first observed eleven years before, and which had been increasing very slowly during that period. She stated that her father had taken her to consult some oculist in Kansas City, seventeen years before consulting me, because of a socalled "enlargement of the right eyeball," but she herself was quite sure that the displacement, even though it might have been present at that time in a moderate degree, did not become markedly noticeable until about eleven years ago.

The patient's family history was negative. So far as she knew, no member of her family had ever had a tumor of any kind. She had been married for several years, enjoyed comparatively good health, and excepting an occasional dull aching pain in the eyeball and the proptosis, presented no symptoms whatever because of the conditions that existed.

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*Read before the American Ophthalmological Society, Washington, D. C., May, 1916.

Examination showed the right eyeball to be proptosed downward, outward and forward. (Figs. 1 and 2.) The proptosis was marked, but the eyelids could be entirely closed. The rotations of the eyeball were concomitant with those of the other eye, but because of the proptosis the right eye could be rotated further downward than the left. As previously stated, no symptom other than a dull eyeache, which appeared occasionally, was observed by the patient. She complained only of the proptosis from an esthetic standpoint.

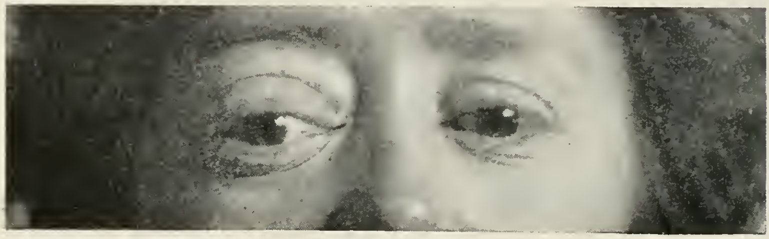

Fig. 1.—Proptosis of right eye.

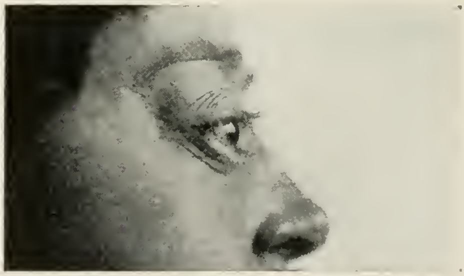

Fig. 2.—Lateral view.

The vision of the right eye equaled 6/6, and the patient could read easily Jaeger 1 at six inches. Vision of the left eye equaled 6/5, and she also could read Jaeger 1 easily at six inches with this eye. There were 3° of esophoria. No diplopia could be elicited, either with or without the red glass. Abduction was 4°; adduction, 15°.

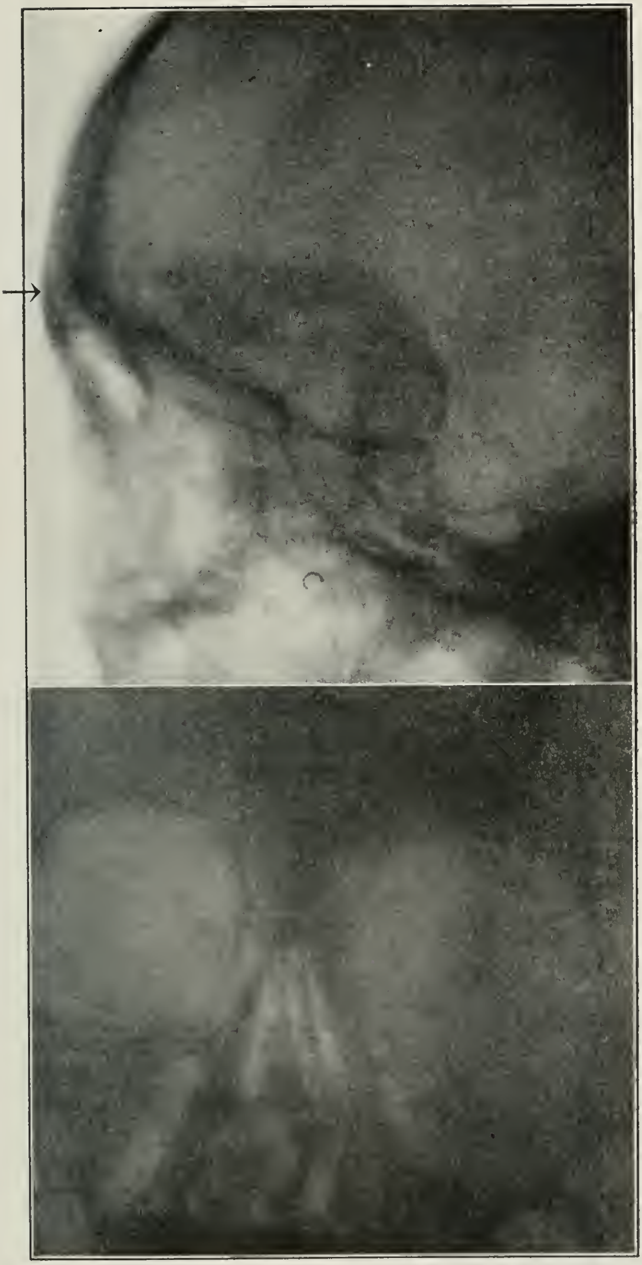

Fig. 3.—Skiagraphs giving lateral and front views of skull.

The pupil of the right eye was four millimeters in diameter, and somewhat more sluggish in its movements than that of the left eye. The left pupil was two and one-half millimeters in diameter. Both reacted promptly to light, convergence and accommodation.

The optic nerve of the right eye was slightly paler than normal, but there were no indications of any preexisting neuritis.

Examination of the orbit revealed a large bony growth, which could be distinctly felt with the fingers, in the upper inner portion. It extended transversely from the region of the ethmoid about half way across the roof of the orbit toward the temporal side, and in depth it passed backward toward the apex of the orbit as far as the finger could feel.

The examination of the nose revealed a small amount of pus in the right naris. None was discovered in the left. The patient did not complain of any sinus symptoms, nor were there any indications of occlusion of the sinuses from intranasal pressure. Transillumination showed a very small frontal sinus on the left side, the area of the right frontal sinus being entirely dark. This indicated, of course, an abscess of the sinus or some affection which prevented transillumination. The upper portion of the right maxillary antrum, just below the orbit, also seemed slightly darker than that of the left side, but exploratory puncture brought no pus.

The field of vision for the right eye was practically normal, and there was no scotoma for form or color. The urine examination was negative. No Wassermann was made.

A skiagraph made by Dr. W. W. Potter, and herewith presented, shows not only the orbital portion of the skull to be involved, but also that a bony growth as large as a medium sized hen's egg extends into the cerebral cavity in the anterior cerebral fossa, giving a shadow fifty-eight millimeters long and twenty-five millimeters broad, measuring from the shadow produced by the base of the skull. This, of course, does not include the concavity of the cerebral fossa, which means, necessarily, that the growth is much larger than above indicated. The growth extends from the frontal sinus anteriorly to the sella turcica posteriorly, overlapping the latter several millimeters. The skiagraph (Fig. 3) would seem to indicate that the frontal, ethmoidal and sphenoidal sinuses on the right side were all involved.

It is believed, therefore, that the condition is one of osteoma, in all probability having its origin in the frontal sinus, both the orbit and the anterior cerebral fossa being involved to the extent above described. While it is a definitely established fact that injuries to the anterior portion of the brain or pressure in this same region is less likely to produce severe disturbance than injury or pressure to the same extent in some other portion of the cerebral cavity, it appears to the writer most unusual that a bony growth of the size of that described and pressing so deeply into the base of the brain in the anterior portion and extending backward to a point slightly beyond the anterior wall of the sella turcica could exist without producing a single symptom of cerebral pressure.

Inasmuch as the patient complained only of the proptosis, and there were and had been no other symptoms, the extent of the growth into the cerebral cavity seemed to the writer to preclude the advisability of any operative procedure at the present time. Should symptoms of cerebral compression arise at any future date, some operative procedure as a palliative measure would, of course, have to be undertaken.

XXXI.

HEREDITARY POSTERIOR POLAR CATARACT, WITH REPORT OF A PEDIGREE.*

S. Lewis Ziegler, M. D., and J. Milton Griscom, M. D.,

Philadelphia.

In September, 1909, two boys, aged ten and fourteen years, respectively, were brought to the Wills Hospital by their mother for the correction of defective vision. Ophthalmoscopic examination revealed the fact that both patients were suffering from double posterior polar cataracts of hereditary type. There were no other ocular abnormalities present and vision in right eye was 20/100, and in left eye 20/70, in the older boy, and in right eye, 8/200, and left eye 8/200, in the younger. Operation was advised and both patients admitted to the hospital.

Upon inquiring into the ocular condition of other members of the family, it was discovered that numerous relatives of these boys had defective vision, and that various surgeons had from time to time been consulted for their relief. After a thorough investigation of all these patients and a close search of various hospital records, the accompanying pedigree was worked out, the cataracts recorded having been either examined personally or their histories obtained from reliable hospital records.

The original member of this family (Dutill) migrated to the United States from France about 1810, but no record could be found relating to the condition of his eyes. The first member of the family who was known to have congenital cataracts was a son of this original settler in America. In the second generation there were nine members, of whom six had congenital cataracts. The third generation contained thirty-one members, of whom ten had congenital cataracts, and the fourth generation contained twenty-three members, of whom seven showed the typical lenticular condition found in this family. In every case examined and in all the hospital records reviewed the opacity was situated on the posterior capsule, and varied from a small round dot at the posterior pole to a dense circular disc covering the central third of the posterior capsule. No other congenital ocular defects were found, and the family as a whole was apparently up to the average of those occupying a similar social position.

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*Read before the American Ophthalmological Society, July 7, 1915.

A study of the pedigree presented shows that there were sixty-four members in the four generations, of whom twenty-four, or thirty-seven per cent, had congenital cataracts. The relative percentage of females affected was slightly higher than that of the males, ten out of twenty-three, or forty-three per cent in the former, and fourteen out of forty-one, or thirty-four per cent, in the latter. The rule of "once free always free" is followed in this family, and in no case did normal patients produce affected children. It is interesting to note with one exception, in the third and fourth generations, just one-half of the children of cataractous parents inherited the condition, while the remaining half was normal. Males were much more prone to transmit the defect, since twenty out of thirty-one children, or sixty-four per cent, descending from cataractous males, were affected, while only three out of nine children, or thirty-three and one-third per cent, descending from cataractous mothers, had cataracts.

	Total.	Affected.	Percentage.
Males	41	14	34
Females	23	10	43
	—	—	—
	64	24	37

The history of the two patients originally seen at the Wills Hospital is rather suggestive of low resisting power, both mentally and physically. Samuel D. was operated on by discission of the lens in left eye, and discharged cured in about five weeks. Three months later the right eye was operated on by discission. In a few days there developed a virulent iridocyclitis with exudate, resulting in complete loss of vision and shrinkage of the globe. After his discharge from the hospital he was not seen again for about two months, when he returned with beginning sympathetic irritation in the eye first operated on. The irritating eye was immediately enucleated, but the iridocyclitis in right eye persisted to such an extent that six months later the globe became shrunken and vision was reduced to doubtful light perception. A letter from his family physician, Dr. Geo. W. Miller, of Norristown, Pennsylvania, stated that some time previously the boy had suffered from a gonorrheal urethritis with such severe systemic disturbance that at one time his life was despaired of. This suggested a possible metastatic origin of the iridocyclitis. The patient is now an inmate of the Pennsylvania Institute for Instruction of the Blind.

The younger brother, Schley D., had been operated on in right eye for a similar type of cataract by another surgeon two years previously, and presented an aphakic eye with clear media and a normal fundus. We found in left eye a characteristic posterior polar cataract. Discission was performed on admission. One month later he was discharged with the eye in excellent condition. Subsequently the patient became unmanageable at home because of a mental derangement and was sent to the School for Feeble-Minded Children, at Spring City, Pennsylvania, to be treated for his mental deficiency. So far as we can ascertain, his vision has been maintained in good condition up to the present time.

Developmental deformities of the eye, especially when hereditary in character, offer an interesting field for study and speculation. The literature contains many reports and pedigrees of inherited ocular defects, none of which exhibit their hereditary character more strikingly than do those of the lens. Most observers have been content with an attempt to explain the embryologic changes which may be responsible for the formation of congenital cataracts, and have done but little to explain the hereditary character of these defects.

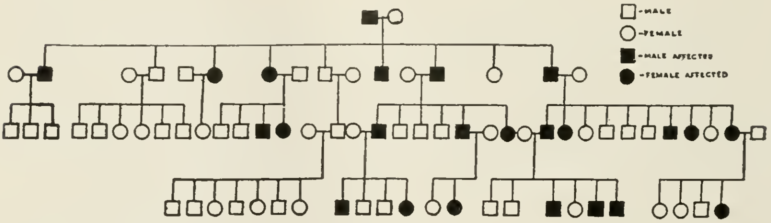
From an embryologic point of view, numerous interesting observations have been made concerning lens defects in the newborn. Von Szily[1] offers three causes for congenital cataract: (1) inflammation, (2) well-known diseases of metabolism, and (3) essential errors in development of the lens depending upon socalled "germinal variation." The last cause was supported by observations on a buck rabbit which suffered from partial congenital cataract which he transmitted to most of his offspring. Examinations during the growth of the embryo revealed dismembered scattered groups of cells at the stage when the lens vesicle was being separated off. These cells developed into fibers, but rapidly degenerated, involving neighboring cell groups in their dissolution. This led to the formation of posterior polar cataract along with several other varieties.

Pagenstecher[2] has shown that there exists a congenital toxic cataract. He produced congenital cataract in one hundred per cent of the offspring of rabbits fed on naphthalin. These were not associated with the separation of the lens vesicle, since the feeding was not begun until the twenty-first day. The result was the formation of many kinds of congenital cataract, not differing in any particular from either the isolated or hereditary cases so often seen. The experiment was carried further, however, to the third generation, when the affected rabbits produced normal offspring, showing that the lenticular lesion was produced by a toxin and not by an essential abnormality in the germ cell of an organic nature.

In relation to the explanation of the formation of posterior polar cataract from an embryologic point of view, MacNamara[3] says: "It was well known that in fetal life, branches of the hyaloid artery covered the posterior surface of the lens, and advanced forward over its margin, helping to form the membrana capsulopapillaris. If from a fault in the development of the eye these vascular layers persisted after birth, it was apt to give rise to a film of connective tissue extending to a greater or less extent over the posterior surface of the lens, and so forming a zonular cataract. In some instances a small patch alone was left to mark the spot at which the hyaloid artery had passed on to the lens."

Collins[4] holds that the lens capsule is the product of the epithelial cells lining it. "The hyalin capsule of the lens was at one time regarded as a structure of mesoblastic origin and the product of the fibrovascular sheath which encircles the lens in fetal life. There is, however, considerable evidence to show that it is really epiblastic in origin and formed as a kind of secretion from the epithelial cells lining it." He[5] further states that "The time during which the posterior capsule of the lens has to complete its development is exceedingly short, as the cells forming the posterior layer of the lens vesicle soon lengthen out into lens fibers and become separated from the capsule. Congenital gaps in the posterior capsule are met with which are bridged over by fibrous tissue formation in the anterior part of the vitreous. This fibrous tissue formation in the vitreous, which sometimes contains blood vessels from the central hyaloid artery, may extend through the gap in the posterior capsule, an admixture of mesoblastic and epiblastic tissue within the lens capsule resulting."

It will thus be seen that observers of congenital cataracts are divided into two schools in their efforts to explain the mechanism by which congenital lenticular deformities are produced: (1) Those who believe the basic cause is toxic, and (2) those who believe that there is an arrest of or an alteration in the development of the lens, due to some inherent abnormality in the germ cell. There is strong evidence to support both theories, and it is probable that neither one singly explains every case of congenital cataract, while in some cases both may be active factors.



Pedigree of congenital posterior polar cataract.

(Dutill family, 1810-1915.)

Collins (loc. cit.) very truly remarks that "To attribute a condition to an arrest of development offers only a partial explanation of its etiology, leaving the cause of the arrest still to be accounted for." Variations in development can be traced with a fair degree of accuracy to a given group of cells in the embryo, but any inquiry into the cause of this variation leads to a very complex situation about which only surmise exists.

Nash[6] thinks that "As regards certain developmental defects, there seems to be no reasonable doubt that on the whole their descent follows the system of the 'Mendelian dominant,' and that they are due to the presence of spcial factors, individuals not possessing these factors being unable to transmit them. The whole body may be influenced by abnormalities in the functions of glandular organs, and through what Garrod has termed unborn errors of metabolism, which latter, at any rate, appear to run in families."

Dr. Charles B. Davenport,[7] after carefully reviewing the pedigree above reported, writes: "The cataract in this family behaves according to expectation as found in other families, namely, as a dominant. We attribute it to mean that there is present in the organism a something that causes cataract. The person who has received the determiner for cataract from one parent only will have it in half of his germ cells, so that half of his children will show congenital cataract. This expectation is roughly realized in the chart. If in some way or other the determiner for early cataract could be got out of the germ plasm, either by chemical means or others, then those germ cells should produce individuals without cataract for an indefinite number of generations. But for the present, so long as these people with early cataract marry, they are bound to perpetuate their trait in half their descendants. Normals need have no fear of marrying or having children."

Loeb[8] divides heredity into three classes: (1) Direct heredity, in which the same disease is found in parent and child. (2) Indirect heredity, in which one or more children suffer from a disease from which the parents are free, but which is present in one or more ancestors, uncle or aunt. (3) Collateral heredity, in which two or more children suffer from a disease which is not found in either of the parents, or seen in their relatives, with the possible exception of cousins of the same generation.

The scientific study of the causes underlying the recorded facts of heredity has just begun, and so far no authoritative statement has been forthcoming. "Observations and experiments on developed animals and plants," says Conklin,[9] "have furnished us with a knowledge of the finished products of inheritance, but the actual causes and stages of inheritance, the real mechanism of heredity, are to be found only in a study of the germ cells and of their development. Although many phenomena of inheritance have been discovered, in the absence of any definite knowledge of the mechanism of heredity, a scientific explanation of these phenomena must wait upon the knowledge of their cause. In the absence of such knowledge it has been necessary to formulate theories of heredity to account for the facts, but these theories are only a temporary scaffolding to bridge the gaps in our knowledge, and if we knew all that could be known about the germ cells and their development we should have little need of theories."

The cause of any pathologic lesion is of interest primarily because it leads more directly to the discovery of methods of cure, and the writers deem it worth while to attempt to determine the etiology of a disease which claims such a large percentage of victims as does hereditary congenital cataract. Are we in such cases dealing with a tendency to germ variation which has exceeded the normal, but which does not assume gross pathologic proportions until by chance two people marry, both possessing a tendency to abnormal variation, the cumulative action of their union producing a visible congenital defect? Or are we concerned with a condition secondary to an intoxication which is itself the result of an abnormality in the internal secretions or a perversion in the function of elimination? Until such fundamental questions are fully answered, we can only deal to the best of our ability with the effect, and contribute our share toward the determination of the underlying cause.

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XXXII.

EXTRACTION OF CATARACTS IN THE CAPSULE BY A SLIGHT MODIFICATION OF THE VON GRAEFE METHOD.*

E. Torok, M. D.,

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The extraction of senile cataracts, being one of the most common and at the same time one of the most important operations in ophthalmology, has undergone a great many changes in its development. It developed slowly, step by step, from the several centuries' old couching to the extracapsular extraction, and then to the intracapsular extraction. Although this latter method has been shown and practiced by several surgeons for almost two centuries, it has not become of much importance until Smith of India described his, since well known, method.

There is no doubt that the intracapsular extraction has its great advantages over the extracapsular method. The visual results in well selected cases—i. e., in cases where the fundus is normal—are always good, the victim being restored to normal, and there is no possibility of the formation of a secondary cataract; the eyes recover quickly, the postoperative complications, as iritis and infection, are less frequent, and, of course, entanglements of the capsule in the wound, with the often detrimental after-results, are excluded.

The method of Smith, according to his reports and to the reports of all those who have visited him and saw his operations, is excellent—if the operation is performed by him or under his personal supervision and directions. The manipulations to dislocate and deliver the lens without serious complications require great skill and long experience. D. W. Greene[1] describes these manipulations as follows:

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*Read before the American Ophthalmological Society, Washington, D. C., May, 1916.

"He (the operator) then makes light pressure, with the point (of the delivery hook) on the lower border of the lens, backward toward the optic nerve. It is not possible to describe in words the amount and direction of this initial pressure, except to say, in a general way, that it should never be excessive or misdirected; one can only reach an appreciation of it by acquiring trained eyes and, best of all, an educated tactile sense. The purpose of this pressure is to dislocate the cataract, an entirely different series of manipulations being required to deliver it without accidents in a high percentage of cases, and these are difficult to describe. They should be learned at the elbow of a competent operator." And later, in discussing the disadvantages of the Smith method, he says: "The operation is highly technical, and can only be learned at the elbow of an expert, who has plenty of material to demonstrate it."

This naturally means that the Smith method will never be accessible to the great bulk of ophthalmic surgeons. It requires an expert teacher and hundreds and hundreds of cataract extractions to master this "highly technical" operation. Very few ophthalmic surgeons are fortunate enough to get more than a few hundred cataract extractions in their lifetime, and in consequence the regular von Graefe extracapsular extraction will remain the routine cataract extraction until some easier and less dangerous intracapsular method has been found. Several ophthalmic surgeons have attempted this.

Stanculeanu[2] describes a method of intracapsular extraction. He uses a special capsule forceps that have no teeth to tear the capsule. The forceps are introduced into the anterior chamber, a firm bite of the capsule is taken, and then, by movements from side to side and up and down, the zonular attachments are ruptured. The forceps are now removed and the lens is delivered, using two spoons, with one exerting continuous pressure over the cornea slightly below the center, and with the other one slight counter pressure is made above the wound.

Vard Hulen[3] devised a vacuum extractor for the removal of the lens in its capsule.

Knapp[4] modified the Smith intracapsular extraction by using the Kalt forceps for dislocating the lens and rupturing its zonular attachments, after which he delivers the lens according to Smith's method. I have witnessed a great many of Knapp's extractions, and noticed what a firm grip the Kalt forceps take on the capsule and how easily its zonular attachments can be ruptured with them.

With the regular von Graefe method, if one uses a capsule forceps instead of a cystotome, it often happens with hypermature cataracts, where the capsule is thickened, that it does not rupture, but the zonule gives way and the lens is delivered in the capsule. This, of course, is an accidental extraction in the capsule, but it happens not infrequently where a great many hypermature cataracts are extracted. I have tried to imitate this accidental intracapsular extraction by systematically using the Kalt forceps instead of the regular capsule forceps with teeth. The operation, therefore, with which I removed the forty-three cataracts in the capsule is nothing else but a slight modification of the von Graefe extraction.

The patient is prepared for the operation in the usual way, a one per cent solution of holocain being used for anesthesia. After the speculum has been inserted and the eye fixed, the puncture and counter puncture are made in the limbus and the incision carried up, following everywhere the limbus and also completed in the limbus, securing at the same time a conjunctival flap. The incision, as in all intracapsular extractions, should be somewhat larger than the incision for a von Graefe extraction, encircling about one-half of the circumference of the cornea. After the regular small iridectomy, the pillars of the coloboma are replaced and the Kalt forceps are introduced into the anterior chamber with the left hand, while the right hand holds a Daviel spoon, the blades of the forceps are opened, and with a light pressure backward a fold of the capsule is grasped. With a few lateral and circular movements the zonular attachments are loosened. Keeping the lens now firmly in hand with the forceps, the Daviel spoon is applied somewhat below the lower limbus. Both forceps and Daviel spoon are now manipulated at the same time. With the forceps we keep up these lateral movements, but at the same time a slight and gentle traction is exerted upon the lens forward—i. e., in the direction of the anteroposterior axis of the eye. With the Daviel spoon a gentle intermittent pressure is applied to the sclera—i. e., the sclera is slightly indented with the Daviel spoon and immediately released, then again indented and released. This is repeated several times, the motions of the scleral wall being about the same as the motions of the wall of a pulsating artery. These manipulations usually rupture the zonule below, and the lower edge of the lens slowly emerges from behind the iris. The Kalt forceps now are slowly moved toward the wound, and the Daviel spoon, the gentle pressure with which becomes continuous the minute the zonule is ruptured, follows the lens just as in the von Graefe extraction, and the lens is delivered with its lower edge first. The rest of the operation—i. e., the replacement of the pillars of the iris and toilet—differs in no way from the usual von Graefe extraction.

The after-treatment is the same as used following a usual cataract extraction. I usually bandage both eyes for forty-eight hours, after which the nonoperated eye is left open. The operated eye is bandaged for six or seven days, the dressing being changed and the eye washed daily; atropin is instilled according to necessity. All my patients sit up in bed twelve hours after operation, and in an armchair out of bed after twenty-four hours have passed.

I have tried this method of cataract extraction altogether in fifty-three cases. In thirty-seven cases I have succeeded in removing the lens in the intact capsule; in six cases the capsule tore while the lens was engaged in the wound, and after the delivery of the lens it remained wedged in the wound in four cases and slipped back into the anterior chamber in two cases. In all of these cases the capsule was removed afterward in its entirety by grasping it with the Kalt forceps and extracting it. In those two cases where the capsule slipped back into the anterior chamber, it was comparatively easy to reintroduce the Kalt forceps, get a hold of the capsule and extract it without injury to the hyaloid membrane.

In five cases the capsule tore before the zonule of Zinn ruptured, a very large piece of the anterior capsule was removed and the lens extracted in the usual (von Graefe) way. In one of these cases the lens became dislocated above—i. e., the upper edge of the lens slipped under the upper edge of the wound; the lens was easily replaced into its proper position with a spatula, and then expressed in the usual way.

In five cases of immature cataracts I could not use the Kalt forceps, as they did not get a hold of the capsule, but slipped off—the capsule forceps with teeth had to be used instead, and the usual von Graefe extraction performed.

I have lost vitreous in two cases; in none, however, during or in consequence of the operation. In both cases the patients have violently pressed the speculum against the eyeball just before its removal, after the completion of the toilet.

The recovery was, in most cases, quick and uneventful. In four cases I found a delayed closure of the wound. In these cases the eyes were irritated, the wound edges not well adapted, slightly gaping, and the conjunctival flap edematous. In five to six days the wound closed, and the recovery from then on was uneventful. I cannot explain this delayed closure, since the pillars of the iris were free; it is not impossible, however, that since the upper edge of the lens is delivered last, some of the fibers of the zonule were pulled up and wedged into the wound.

In one case a severe iridocyclitis with plastic exudate developed on the fourth day after the operation, resulting in a total occlusion of the pupil and coloboma, with perfect perception of light and localization.

In one case the day after the operation we found the eye red and irritated and considerable blood in the anterior chamber; the blood absorbed slowly and the eye recovered perfectly, but in the pupillary area the hyaloid membrane seemed to be somewhat elevated above the level of the iris, and this cyst-like elevation contained some blood. The patient saw 20/40 with the proper correction, but complained of a constant blur before the eyes. We have watched this condition for nearly two years, but the blood has not absorbed entirely. The same patient's other eye was operated on and the lens removed in the capsule about one year after the first operation, and the same curious condition developed. A similar condition developed in another case, where only one eye was operated on, the vision being only 20/70 with correction. The visual results in the forty-three operations where the lens was removed with its capsule are the following (those six cases where the capsule ruptured but was removed entirely afterwards included):

20/30 or better, thirty-four cases.

20/40 or better, two cases. These are two eyes where blood under the hyaloid membrane in the pupillary area was found.

20/50, one case. In this case much blood was found in the anterior chamber following the operation, and considerable amount of blood pigment was left on the hyaloid membrane.

20/70, three cases. In two of these cases there were opacities in the vitreous following loss of vitreous, and in one case there was blood under the hyaloid in the pupillary area.

20/100, one case. This was an ambloypic and strabotic eye.

6/200, one case. In this case, after the removal of the cataract, we found central choroiditis in the fundus.

Hand movement, one case. In this case a plastic iridocyclitis developed following the operation.

In conclusion, I wish to say that in my limited experience the removal of the lens in its capsule with this slight modification of the von Graefe method is very simple and easy for anyone who is experienced in the usual von Graefe extraction. I believe that the danger of loss of vitreous is even less than in the usual von Graefe extraction, because the lens being removed by a combination of traction and pressure, the pressure to be applied is infinitely less than that used in the former method. The Kalt forceps are very well adapted for use in mature, hypermature and nuclear catracts; they can, however, not be used in immature cataracts. In these latter cases I believe they could be substituted for to an advantage by Vard Hulen's suction extractor or some similar device.

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XXXIII.

ON THE AMBULANT AFTER-TREATMENT OF CATARACT EXTRACTION, WITH A NOTE ON POST-OPERATIVE DELIRIUM AND ON STRIPED KERATITIS.*

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NEW ORLEANS.

For the last twenty-two years we have worked in the large clinic (about thirty-five hundred admissions annually) of a hospital with a limited housing capacity. The beds for white and for black, for men and for women, had, too, to be shared with the ear, nose and throat department. Under these circumstances my colleague, Dr. E. A. Robin, and I have restricted our interned cases to the irreducible minimum. Thus we have had an opportunity to see how well the severest wounds of the eyeball will heal, if properly attended to, while the patient remains at home, visiting the hospital daily for treatment and dressing.

In 1907 we were impressed by the case of a negro man, who having undergone extraction, and the eye having been dressed, through a misunderstanding of orders, walked to his home, some five miles away, and only returned for inspection forty-eight hours later. The eye being found in excellent condition, he was allowed to come and go in the same way until he made an uneventful recovery; the restored vision being 20/40 with his first spheric glasses.

We determined the next year, 1908, to treat a number of our patients after extraction as walking cases. In 1908 thirty-nine of our extraction cases were confined to the hospital and to bed. Of these thirty-nine cases, five, or twelve per cent plus, were failures; one through infection, one through iridocyclitis, one proved to have optic atrophy, and two injured their eyes by striking them against the furniture or with their hands. Twenty-five were treated as ambulant cases—that is, the eye being dressed, they got down from the table and went to their homes afoot and in street cars. Returning in twenty-four hours to the clinic, their eyes were redressed if there were complaints of pain; if there were none, the dressing was not removed for forty-eight hours. Of these twenty-five extractions, two were failures, eight per cent; one infection and one iridocyclitis following discission of the after-cataract.

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*Read before the American Ophthalmological Society, Washington, D. C., May, 1916.

Reviewing all of our extractions of senile cataract done in our clinic during the sixteen years from 1893 to 1908, both inclusive, we find, that counting the thirty-nine cases in 1908, there were three hundred and seventy-one cases confined to bed and to the hospital, with thirty-nine, or ten per cent plus, of failures. Counting the twenty-five in 1908, there were during the six years up to 1915, two hundred and thirty-two extractions of senile cataract, with eighteen, or seven per cent plus, of failures among the ambulant cases. No case in which vitreous was lost was treated as an ambulant one.

For a complete understanding of the experiment I must be permitted to give a brief account of our practice. In the total six hundred and three extractions, with fifty-seven or nine per cent plus of failures, only cases of mature or immature senile cataract are included. The few hypermature cases are negligible. The complications, so far as we knew at the time of operation, were nothing worse than posterior synechiæ. From the beginning we have conformed our operation more and more strictly to the large corneal section in the limbus, with an iridectomy and with a moderate conjunctival flap; the capsule being opened with the point of the knife after puncture and before counterpuncture. In a number of cases we, especially my colleague, have used the long, undivided conjunctival bridge; with advantage, we believe, when loss of vitreous, infection, or perhaps other accidents are apprehended. The long undivided bridge, besides holding the edges of the incision together, keeps back the vitreous and maintains unbroken the line of nutritive supply to a large part of the corneal flap. It is especially indicated in the extraction of dislocated lenses.

At many times during these twenty-three years, and before, the preliminary discission of immature cataracts has been tried, but always abandoned. We have made the extraction from five to thirty days after the discission, and once after twenty-four hours. The untoward uveal hyperemia induced more than offset any supposed advantage. During the preambulant period, if we may be permitted the phrase, we made many simple extractions, but had abandoned the practice by 1908 as unsuited to hospital patients save in exceptional cases.

Avulsion of a part of the capsule with Fuchs' forceps was also tried in a number of cases, but as we could see no lessening of the number of after-cataracts, we went back to opening the capsule with the knife point. Complete anesthesia of the cornea and iris was obtained by deep postocular injection of the ten (4 per cent cocain), ten (1 to 1000 adrenalin), twenty (normal salt) mixture (Robin, 1905).

Our patients being extraordinarily given to exploring the eye with their fingers, or to knocking it against the doors or the furniture, the dressing employed was directed to protection against such accidents. It was composed of a disc of gauze next the lids, a carefully disposed pad of absorbent cotton, a figure of eight bandage of the most elastic flannel, a cataract cage like a pair of wire tea strainers joined together, the padded edges resting on the bones of the orbit, and over all a moist bandage of cheap mosquito net containing much sizing, which set when dry into a light cast. For almost all of the twenty-three years, the eye not operated upon was left undressed. While this dressing was effective in protecting the eye from blows and intruding fingers, striped keratitis was of almost constant occurrence.

About 1905 we adopted the dressing of Prof. Blanco of Madrid. It consists of a disc of fine gauze fastened with flexible collodion to the rim of the orbit and the inner side of the nose; a carefully placed pad of absorbent cotton, and over this another disc of gauze, slightly larger than the first and also cemented down with collodion. Over this we put the cataract cage and the half figure of eight mosquito net bandage. This is a lighter, cooler and more exclusive dressing; but I mention its adoption particularly because since its use the striped keratitis with which we had been plagued has virtually disappeared. The only difference to which this can be ascribed is the pressure upon the eye produced by the former and the total absence of pressure by the Blanco dressing.

In the absence of pain, the dressing is never removed until forty-eight and sometimes seventy-two hours have passed. With lengthening experience our tendency is to leave the dressing longer and longer undisturbed, and once removed rarely and more rarely to renew it; but to cover the eye with the cataract cage only, under which the natural movements of the lids promote cleanliness and the riddance of secretions. Indeed, we have long been convinced that all dressings are, in the majority of cases, evils necessitated by the lack of perfect self-control on the part of our patients. Since 1908, when we began to enjoy the advantage of the examination by a skilled pathologist of the secretions of eyes about to be operated upon, we have, in a few cases in which the presence of pathogenic organisms could only be abated, or at best eliminated for brief intervals, done away with all dressings; allowed the patient to lie with the eyes closed and instilled between the cautiously partly opened lids a ten per cent solution of argyrol at intervals of an hour, or as near thereto as possible. In each instance healing progressed without infection to a satisfactory result.

The after-treatment of all cases consisted in cleansing with alternate instillations of ten per cent argyrol solution and the borax-boracic acid-camphor-water wash, known in the clinic as "B. & C.," in a Todd's undine or irrigator; the use of atropin, and if inflammation appeared, prolonged inunctions on the forehead (for relief of ciliary pain) of Arlt's salve (ungt. hydrarg., two ounces, ext. belladon., one dram). Often carefully graduated amounts of dionin powder to promote the absorption of cortical matter or exudative material, together with hot bathing of the closed eye were used.

The cases were entirely unselected. So soon as the better eye was useless for reading, the more mature cataract was extracted. The pursuit of this plan has inclined us to the belief that a previously healthy state of the eye to be operated on, especially a lifelong freedom from any disease of the uvea, is more important in respect of a successful result than, within reasonable limits, the general condition of the patient.

At a meeting of the section on ophthalmology of the American Medical Association (Transactions, 1913, p. 395), Dr.

Walter R. Parker, of Detroit, read a paper on "Postcataract Extraction Delirium," with a report of eleven cases. He called attention to the fact that postoperative dementia was noted as early as the sixteenth century, that it is said to be more frequent after operations on the pelvic organs and upon cataracts, and he summarized the highly divergent opinions of the general surgeons upon the subject. In many respects the dementia following cataract extraction must differ from that sometimes following general surgical operations; for, even when infection takes place, the area is too small to give rise to those intoxications that beset more extensive operations. Cataract extraction, too, differs in one particular from almost all other surgical operations, in that it is performed upon the aged only—the aged in fact, if not in years. I am not aware that delirium after discission of a juvenile cataract or following the extraction of the lens for high myopia in a young person has ever been reported. The cases reported in Dr. Parker's excellent paper, and those mentioned by the members participating in the discussion, were all in old people; and it seemed to be the consensus of opinion that the dementia arose from the confinement in the dark under strange, and if one may say so, lonely conditions of an aged person. It seems to be fairly well established that dementia is more likely to occur when both eyes are bandaged, and that under such circumstances the removal of the bandage from one eye is almost sure to restore the reason.

Our experience with the ambulant after-treatment strongly confirms this view. During the time that we confined our patients to the hospital and to bed, we had several (I am unable to state the exact number) cases of postoperative dementia. The delusion seemed to take the form of terror, or apprehension of great danger, and in not less than three instances the patients succeeded in eluding the attendants and in killing themselves by leaping over the banisters or out of the window of the third story. Indeed, on reflection, there is nothing surprising in all this. All of us realize that old persons bear change badly. The time-worn machinery seems to keep going only because it can continue to run along the wonted grooves that have long since become those of least resistance. All, too, have observed that the effects, mental and physical, following an extraction are often entirely out of proportion to the severity of the operation. Hope and fear, dread and doubt, anticipation and resolve, all play a part. The old man's courage has been screwed up to the point of putting to the touch the most precious hope of the future, and when in a few minutes the unknown ordeal is over, what wonder that the tension drops so fast and far as to overturn the aged mind? The finer the nervous organization, or, in other cases, the greater the susceptibility of the ignorant and lowly to the dread of the unknown, the greater the pomp and circumstance of the operation, the stranger, the darker, the stiller, the lonelier the after-treatment, the more likely is the mental disturbance to occur.

The power of these circumstances, and these alone, to bring about dementia after cataract extraction is attested by the fact that among our two hundred and thirty-two ambulant cases not a single instance of this complication appeared. The risks and chances of the operation should never be made light of; it is one always to be done under the advantages of a modern operating room; it should not be lightly undertaken, either by the surgeon or the patient; but I cannot doubt that the comfort and morale of the patient are greatly enhanced by his prompt return to his home, his family and the thousand and one particulars summed up in the phrase "familiar surroundings." There he should be enjoined to rest in bed or in a reclining chair, and to observe those other precautions which medical common sense dictates to all convalescents.

It is needless to say that he should not visit the clinic unattended. The two instances only in which unfortunate results could without doubt be ascribed to the ambulant after-treatment, happened through the neglect of this precaution. Two patients foolishly tried to reach the hospital alone; both had severe falls and their eyes were destroyed, the one by iridocyclitis, the other by an intraocular hemorrhage.

In conclusion, let me say that I set no store by the small percentage shown in these six hundred odd extractions in favor of the ambulant after-treatment; but it is at least interesting that the percentages are not markedly unequal.

XXXIV.

A HAND MAGNET OF THE INNER POLE TYPE.

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Chicago.

The Hirschberg hand magnet is the only instrument of the small type that has found general favor, and to this day is the only magnet in the hands of many ophthalmologists. Innumerable types of the giant magnet have been proposed with more or less success, but they are too expensive and too unwieldy for use in a private office.

The following magnet was constructed in order that a powerful, light-weight magnet be accessible to ophthalmologists whose foreign body work is insufficient to warrant the expense of a giant magnet. The instrument consists of a coil of insulated wire contained within a vulcanite cylindrical casing, 12.5 centimeters in diameter and 4.3 centimeters thick. (Chart I.) The aperture in the coil has a diameter of 4.5 centimeters, and the entire instrument weighs 1.28 kilograms. Accompanying the coil are five iron pencils or inner poles; a short solid one, 45 millimeters in diameter, weighing 830 grams, for the purpose of converting the magnet into a permanent pole type; and four slender rods, 25 centimeters long, with diameters of 5, 7, 10, 13 millimeters, and weighing 32, 48, 128, 224 grams, respectively. The magnet is connected to a 110 volt direct current circuit without any change in voltage or amperage.

In use, the solenoid is laid over the patient's eye with the aperture corresponding to the palpebral aperture. The lids can be retracted directly through the opening by means of non-magnetic lid retractors. As the foreign body thus comes within the magnetic field of the solenoid, any steel or iron will attract it as soon as the magnetic force is greater than the resistance. The poles that accompany the magnet are the most practical for this purpose.

In order to test the power of the magnet, the following exper-

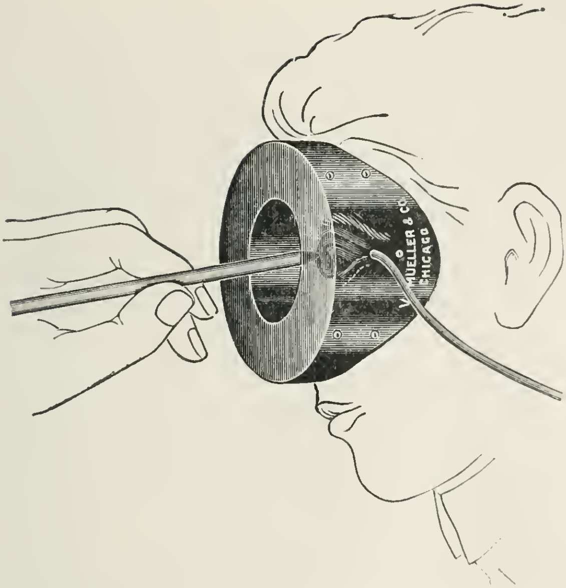

CHART I.
Magnet showing solenoid, pole and electrical connections.

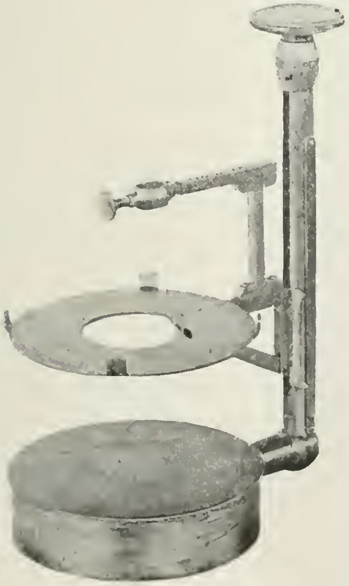

CHART II.
Testing stand.

imental device was contrived (Chart II): A stand from which rises a graduated arm; extending over the stand and supported by an arm from the upright is a shelf, upon which rests the solenoid; this shelf is raised or lowered by the action of a helical screw in the upright; above the shelf is a bracket to hold the inner pole in a vertical position. Thus the actual power of the magnet to lift weights of various amounts can be determined in millimeters. Further, the power exerted by the magnet varies with the amount the tip of the inner pole protrudes beyond the lower plane of the solenoid. This, too, had to be determined for the various weights. Charts III, IV, V, and VI show the force of the magnet in terms of millimeters with the various sized inner poles, with weights of (1) 0.066, (2) 0.033, and (3) 1.0 grams, together with varying amount of protrusion of the inner pole or pencil beyond the plane of the solenoid.

The principle of this magnet is not radically new, for Mellinger[1] in 1904 proposed a giant magnet of this type. He built the instrument so that the patient's head rested within the aperture of the solenoid that was fastened to a massive stative. The objection to this instrument lay in its size and expense. Various writers used and commented favorably upon this type of magnet (Mellinger,[2] Gifford,[3] [4]—and others). They all agreed that with the inner pole magnet the lines of magnetic force emerge from the plane of the solenoid in nearly parallel lines, instead of along divergent lines, as in the permanent pole type, thus increasing the power. Further, the operator is able to be more deft in the removal of a foreign body, owing to the light weight of the instrument he has to handle.

In addition to the aforementioned advantages, the small inner pole magnet will be found to be valuable in the removal of deep-seated foreign bodies so located that it is necessary to introduce an instrument within the eye itself. Here the smallest pencil can be used and with but a minimum of trauma, and its lines of force and its power are sufficient to dislodge the average body, even in the posterior segment of the eye. The average intraocular foreign body is small. Haab[5] reported three hundred cases, with ninety per cent of the bodies weighing between 0.001 and 0.01 grams.

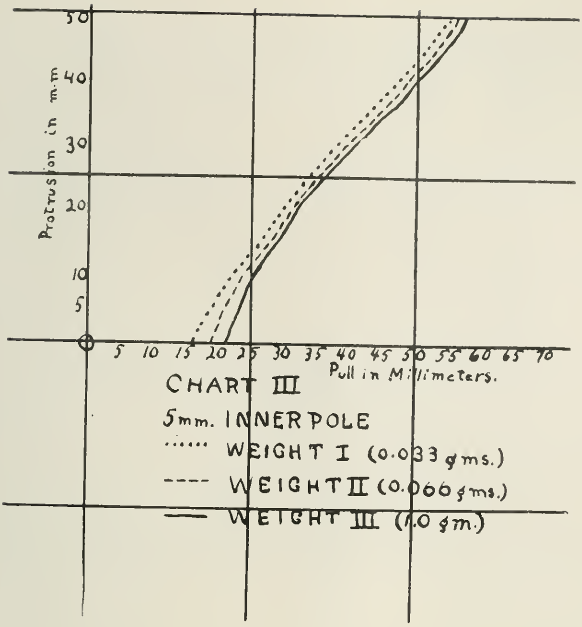

CHART III

5mm. INNER POLE

...... WEIGHT I (0.033 gms.)

---- WEIGHT II (0.066 gms.)

—— WEIGHT III (1.0 gm.)

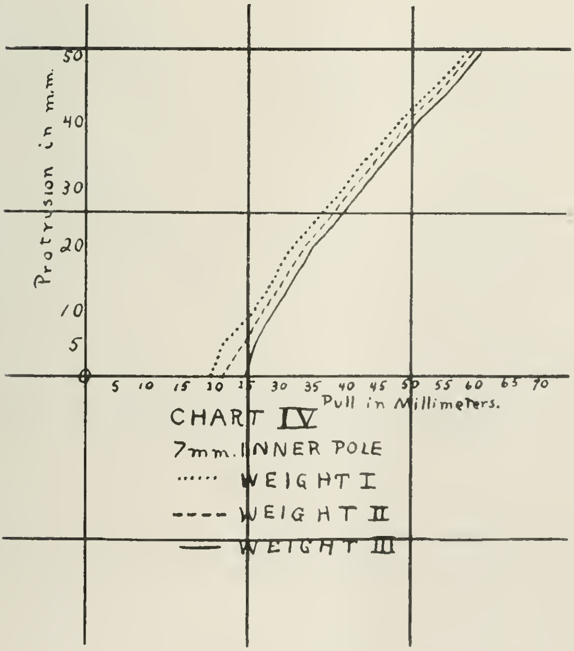

CHART IV

7mm. INNER POLE

...... WEIGHT I

---- WEIGHT II

—— WEIGHT III

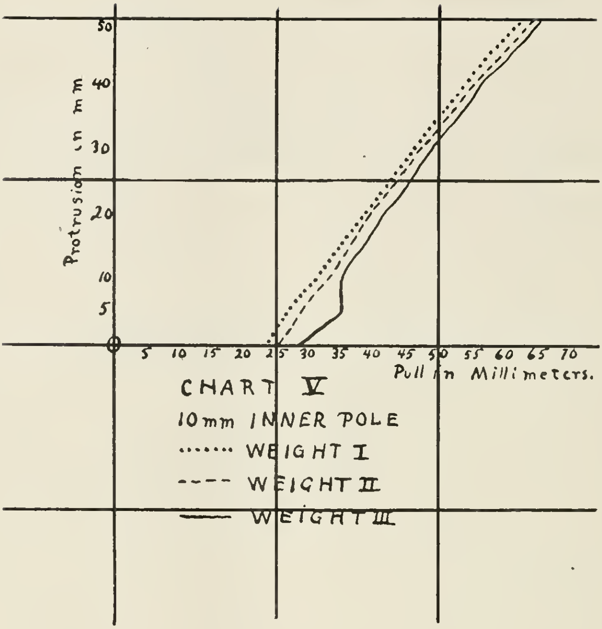

CHART V

10mm INNER POLE

.... WEIGHT I

---- WEIGHT II

—— WEIGHT III

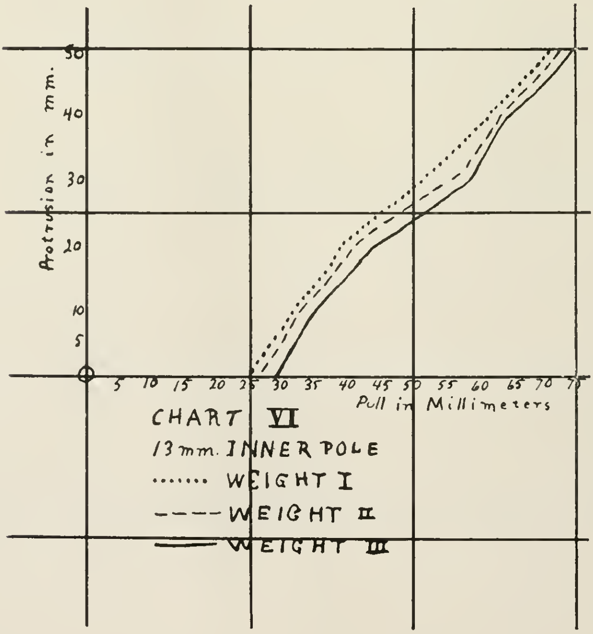

CHART VI

13mm. INNER POLE

.... WEIGHT I

----- WEIGHT II

—— WEIGHT III

The small type of inner pole magnet offers the following advantages:

1. The price is low.
2. The foreign body is removed by manipulation of the magnet, not by manipulation of the patient's head.
3. The working part of the magnet is light.
4. The power is greater than any of the present forms of hand magnet.
5. The operator's view is at all times unobstructed.

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XXXV.

A CASE OF GLAUCOMA FOLLOWING USE OF ATROPIN WITH UNUSUAL COMPLICATIONS.*

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Newark.

Unusual clinical cases are, as a rule, instructive and worth recording, and as this one was new to me after many years of special work, I am giving the main facts as briefly as possible.

Mrs. F., Russian by birth, a vigorous, healthy woman, thirty-eight years of age, presented herself at the clinic, November 2, 1914, with asthenopic symptoms. She gave no history of former illness; had had children, but not for several years, but had missed her last menstruation, an unusual circumstance. Her vision was 20/20 each eye. A solution of atropin, one-half per cent, was prescribed as a cycloplegic. When she returned, two days later, her vision, as recorded, was: Right eye, 20/30; raised to 20/20 w. + 1.25 D. spher. Left eye, 20/30; raised to 20/20 with +.50 D. spher. ⌢ + .25 D. cyl. axis 150°.

Her next visit was on November 11th, when I saw her for the first time. She then complained of great dimness of vision. There was slight pericorneal injection, pupils widely dilated, the right cornea steamy, tension thirty. Vision reduced to 20/40, each eye. Warm compresses locally, were ordered, and a two per cent solution of pilocarpin.

November 13th, both pupils were contracted to normal size; tension normal, as judged by palpation, ophthalmoscopic examination negative, no cupping of either disc.

November 15th, vision 20/20 each eye. One week later she came again to the clinic, when she was seen by one of the assistants, a man of experience, who felt sure there was a mild iritis, the pupils being contracted and slight synechia in the left. Atropin was again prescribed.

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*Read before the American Ophthalmological Society, Washington, D. C., May, 1916.

November 28th the patient returned with a decided glaucomatous condition in both eyes, pupils dilated, anterior chamber shallow, cornea steamy, tension high, and vision reduced to fingers at ten feet. Eserin solution, quarter of a grain to the ounce, together with moist heat, was prescribed locally, and sodium salicylate internally.

Two days later, being no better, she was admitted to the hospital and a subconjunctival injection of sodium citrat (26 grs. ad. oz. 1) made in each eye. This proving of no benefit, a paracentesis of each cornea was made.

Twenty-four hours later, December 4th, the patient's condition being no better, iridectomy was performed upon each eye. Hemorrhage into the anterior chamber followed the corneal incision each eye, hiding the iris, but the tension was reduced at once. Upon removal of the dressings, for the first time the left coloboma was found correct, but in the right eye the iris was seen to be entangled in the angles of the corneal incision. The tension in that eye was slightly greater than that in the left, which was normal apparently.

The patient did well until December 9th, when the left cornea became milky—not especially like striped keratitis, but looking more like a general infiltration of the corneal layers. To my dismay this appearance steadily increased for several days, and I was anticipating sloughing of the cornea, with all its sequelæ, when the trouble began to mend under rather strenuous applications of hot compresses, and continued to improve rapidly, the cornea being again clear in about a week. As the tension of the right eye still was greater than it should be, a broad corneal incision was made with a Graefe knife, completely severing the columns of entangled iris, and the tension in that eye was reduced at once, and remained so. The patient was allowed to leave the hospital for the holidays, reporting at the clinic occasionally, and continuing the use of eserin, as the pupillary spaces were larger than they should have been, although the tension was good.

On January 10th, the patient reported that the evening before, while making a great effort to see some small object, she was startled by a sudden and severe pain in her left eye—her better eye. At the lower nasal sclerocorneal border, some distance away from the corneal scar, was seen a dark protrusion the size of a buckshot; evidently a sclerocorneal rupture with prolapse of the iris at its periphery. There was no history of any injury which might cause such a condition. Although a pressure bandage was applied, this little swelling slowly increased, for ten days, until it was as large as a large pea, oblong in shape, its greater length corresponding to the border of the cornea. A free section was then made through the protrusion, which collapsed as the aqueous escaped. A pressure bandage was again applied, and this performance was repeated several times at intervals of two or three days. The swelling gradually grew smaller and in about three weeks was completely gone, the surface being level with the surrounding cornea. The patient reported occasionally at the clinic, still continuing the use of eserin.

A refraction test made April 20, 1915, showed the vision of the right eye to be 20/100 with correction of an enormous corneal astigmatism, while in the left eye, the one having had the sclerocorneal rupture, she saw 20/30 with correction. There were no further signs of glaucoma, and tension was normal in both eyes.

April 26, 1915, her vision in right eye was 20/100 with + 4. D. cyl. axis 120°. Left eye, 20/20 w. + 2.50 D. cyl. axis 150° at right angles with —3.50 D. cyl.

May 18, 1915, vision in right eye still 20/100. Left eye, 20/15 with above correction.

When I saw the patient last, in November, 1915, just before she left for South America, and one year after the beginning of her trouble, the vision was still 20/15 in the left eye, and she could read the smallest type readily.

This case is reported chiefly on account of the spontaneous sclerocorneal rupture and prolapse of iris, and the excellence of vision after treatment by repeated paracentesis. It also emphasizes the great mistake of neglecting to relieve iris entanglements, especially in glaucoma, as shown in the other eye. The immediate improvement in tension, when the pillars of the entangled iris were cut across, was conclusive—to my mind—that this should have been done earlier. The danger of the use of atropin in some cases under forty years of age is also exemplified, but I do feel that no other drug will so completely and surely give us absolute paralysis of accommodation, especially in childhood. Why this rupture occurred, I am unable to say, unless it be that there was a peculiar lack of resiliency in the cornea, as indicated by the unusual infiltration into the layers of that membrane, following the iridectomy. I might add that the woman menstruated regularly during the entire time she was under observation.

As I look back upon the history of this case, it seems a warning against temporizing in such a serious condition as acute glaucoma, and had a Lagrange or similar operation been made early, no doubt good vision would have been preserved in both eyes.

XXXVI.

HIGH HYPEROPIA FROM A CLINICIAN'S STANDPOINT.*

Howard F. Hansell, M. D.,

Philadelphia.

A clinical analysis of two hundred cases of hyperopia of three degrees and higher, taken alphabetically from the case histories, was undertaken for the purpose of learning the reasons that obtained in preventing each and every case from gaining relief from asthenopia when the estimation of the refraction was accurately made.

No special difficulty in the refraction work presents itself in the absence of disease or irregularity of the refracting surfaces. Vision of full acuity cannot always be obtained, but vision less than 6/6 is not incompatible with a perfect correction, for reasons that readily suggest themselves.

The hyperopia of aphakia, because of the loss of accommodation and the thereby acquired abeyance of the relation of the intraocular and extraocular muscles, should be excluded, except for comparison.

Each case in which either a part or all of the hyperopia is latent presents a problem by itself. It is an easy matter to follow the usual routine of paralyzing the accommodation and determining the combination of sphere and cylinder which will give the best vision, but it is quite another matter to order and to have correctly made the pair of lenses which will relieve the asthenopia.

Theoretically the combination which neutralizes the entire optical defect, when the glass is held at the proper distance from the cornea, should be worn. This, as we all know, is, as a rule, impracticable. The amount to be deducted from the full correction varies rather with the ocular requirements of each case than with the degree of hyperopia. If regulated by the latter, as seems to be the rule, the deduction is in direct proportion to the hyperopia. A few patients among those of the extremes of hyperopia may wear full correction with comfort. In the majority, deductions must be made for the sake both of satisfactory vision in the distance and the avoidance of sudden change of relations between accommodation and convergence.

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*Read before the American Ophthalmological Society, May, 1916.

The obstacles to the relief of asthenopia, after the error of refraction has been accurately determined, are to be sought for in the relative convergence and accommodation, or in the construction or fitting of the lenses to the eyes individually and as a pair. Hess states the proposition simply, and assumes that by following his suggestion no difficulties will be encountered. He says: "Therefore, one chooses deliberately convex glasses of the strength that the ciliary muscle shall only be depended on or have work enough to see clearly in distance and near without asthenopia." The whole problem is thus briefly summarized and appears to be, from Hess' standpoint, extremely simple. That it is complex and difficult we know full well.

Disruption early in life of the normal relation of accommodation and convergence—one diopter to one meter angle—may not be permanent, and balance may be restored by suitable glasses. For example, internal strabismus, without amblyopia, is often corrected without operation. But in adult life the habit of years is less readily overcome. The ciliary muscle has gained in power, or the lens curvature, while under the influence of the chronic contraction of the muscle, is increased, thereby diminishing the hyperopia for all waking moments. One can hardly conceive of the independent action beyond the relative range of the accommodation, and even outside the relative range, unless artificially produced, the accommodation demands conjoined and proportionate convergence. Under full cycloplegia the power of convergence is unaffected. The adaptation of a glass that will restore vision to 20/20 presents no difficulty, in the absence of ocular disease, but the comfortable wearing of that glass after cycloplegia has passed away is quite otherwise. Reckoning must be had with both the restored accommodation and with the new relation incident to the glasses, between convergence and accommodation. Some patients unconsciously and immediately adjust themselves to the new conditions. Others never do.

Mrs. F., aged thirty-eight years, has been under my observation for fifteen years. She suffered with nearly constant headache the only apparent cause for which was hyperopia of about three diopters. The degree of hyperopia and intensity of asthenopia varied from time to time, and new corrections were given yearly. She had absolute freedom from headache only when both eyes were under the influence of belladonna. No combination of spherical glasses, or full or partial correction, or the constant use of the glass, or its use only in near, availed. No two consecutive examinations resulted in the same formula. There was always an uncertainty and indecision during the testing when the cylinder axis was shifted a few degrees, or when the strength of the sphere was slightly increased or diminished. Retinoscopy showed a decided difference between the refraction of the pupillary area and the periphery of the cornea. Therefore, examination with dilated pupil must necessarily be followed by postmydriatic refraction. Notwithstanding the overaction of accommodation, this patient had a low grade of exophoria for distance and a higher grade for near. She was one of those patients, not infrequently met with, who wander from one oculist to another and who never get relief, in spite of most careful refraction, because of an incorrectable disturbance of the relation of accommodation and convergence, probably dependent on accommodative strain during school life.

The size of the pupil is a factor that should not be ignored. A correction that is not full, or nearly full, favors contraction of the pupil and consequently diminishes the functioning area of the cornea and makes the demand for a strong glass even less imperative.

Differences in the power and range of accommodation in the two eyes, to which Duane has recently called attention, if unsuspected and unsought for, will prevent full relief. The difference may depend upon less hyperopia in one eye or be independent of the refraction. At the time the postmydriatic examination is made, when the refraction of the two eyes is known, the near point of each eye is to be determined and the glasses ordered modified by the findings.

Mrs. Y., aged twenty-five years, has never worn glassses. Complains of asthenopia and intense headache. Vision equals 20/20. Hyperopia of 3.50; orthophoria. She was entirely relieved of all her symptoms by .50 D. less than full correction. This patient's immediate adaptation to the new conditions controverts all our theories. The unconscious constant use of 3.50 D. of accommodation produced no vertical or horizontal muscular imbalance. The eyes immediately adapted themselves to the revolution in their use and the muscular coordination was unmodified.

Numerous cases of this kind may be unearthed by a search through our records. In some the hyperopia is associated with a low degree of astigmatism, and in others it is uncomplicated. The ciliary muscle is probably not really hypertrophied, and the excess of convergence, stimulated for years by the accommodation, has been within the limits of the normal relation. The correction immediately removes the stimulation to the third nerve, which apparently had been the only abnormality traceable to the hyperopia.

The explanation of such inconsistencies in two persons of the same age, sex and methods of living, with practically the same optical defects, may be temperamental, a factor frequently overlooked in the oculist's office and impossible to foretell.

In the higher grades of hyperopia, 6 D. and upwards, relief from asthenopia is readily obtained by wearing approximately full correction. The patient feels the necessity for a glass. His eyes are useless for near work and for accurate vision without it, and in spite of annoyance he is willing to wear the glass because of the better vision until he finds it essential for both comfort and vision. The same statement applies to high hyperopic astigmatism. The adaptation to the full correcting glass, provided the axis is accurate, is immediate. There should be accommodation and convergence anomalies, as in simple hyperopia of equal degree, but if present they are lost sight of in view of the immediately recognized advantages secured by wearing the glass.

Mrs. B., aged twenty-seven years, had daily headache, dizziness, vomiting. She wore for eight years with entire relief R. + 4 ⌒ + 3 cyl. ax. 75°, L. + 3 ⌒ + 4 cyl. ax. 97½°, .50 D. less than full correction. The symptoms returned, to be again relieved by a slightly stronger glass, and five degrees change in the axes of the cylinders. The muscles remained in balance.

Mr. C., astigmatism of 4 D. and 4.50 D. and esophoria of 7°, had no asthenopia whatever after commencing to wear full correction for astigmatism.

K., aged eleven years. Never wore glasses. R. + 11, L. + 11, full correction, became immediately indispensable.

One is inclined to charge the unrelieved asthenopia to an impairment of general health, and often correctly. Oncoming illness, chronic invalidism, or convalescence, may invalidate the most accurate correction of refraction errors. Idiosyncrasy, disposition, unwillingness to accept new thoughts or impressions that do not originate in oneself, must be taken into account.

The psychology of the ocular radical revolution brought about by the beginning of the wearing of glasses for the correction of high defects, presents an obstacle not often seriously considered. Routine refraction work, however careful, is sometimes unavailing, unless strengthened by a feeling of confidence on the part of both physician and patient that the glass prescribed is the right and only treatment. Persistent wearing of the glass will prove that the confidence has not been misplaced. No other remedy can be efficacious, and the sooner the patient admits it and yields, the sooner is he relieved. A patient said to me that if she had selected the most unsuitable pair of glasses in a store, they couldn't be worse than those I ordered. She had consulted me against her will. In a few months she returned, voluntarily confessed that she had worn the glasses constantly and the eyes were entirely comfortable. Some psychic influence dominated her thought and action, irrespective of the character of the glasses ordered. Such persons are difficult to deal with and tax to the utmost the refractionist's easily exhausted patience. Only a consciousness that the patient's judgment is at fault or his mind temporarily unhinged may carry the treatment to a successful conclusion.

The oculist's best work, the result of the combined function of all his mentalities, may be neutralized by inaccurate grinding of the lenses, involving both the two curved surfaces and the optical center or the maladjustment of the lenses before the eyes. The creation of one-half or higher degree of hyperphoria by the glass will be a source of discomfort. Such an artificial muscular imbalance is not infrequent. It may be detected by a simple and easily carried out method. It is assumed that the muscular status before refraction and with the correction is known. The Maddox rod or other tests for heterophoria may be applied to the optician's completed glasses when the patient brings them for inspection. Variation from the previous findings indicate prismatic action of the lenses. An apparently perfectly fitting nosepiece may be the source of trouble by compressing the skin and vessels or by dragging the median end of the lower lid away from the ball, an unsuspected obstacle to the relief of lacrimation, asthenopia and the comfortable wearing of glasses.

Asthenopia, in cases in which one eye has been destroyed, is promptly relieved by accurate correction, principally because in such patients there is no convergence and accommodation relationship, and the power and range of accommodation of one eye only to be considered. A full or nearly full correction may be worn without loss of visual acuity. For instance, Miss L., aged twenty-seven years, has 20/15 partly with a + 3.25 $\bigcirc$ + 1 ax. 75°, full correction, which she wears with comfort.

The obstacles to the perfect relief of asthenopia most frequently encountered are deficiency of adjustability of the convergence to the altered stimulation to the ciliary muscles or association of accommodation; differences in the accommodation of the two eyes; the mental attitude of the patient toward glasses, or his oculist; ill health; and the imperfect work of the optician.

XXXVII.

THE BLIND SPOT.

(SECOND COMMUNICATION.)

Harry S. Gradle, M. D.,

Chicago.

In this, the second article of the series upon this subject, the discussion will be limited to the normal Blind Spot for black and white and its variations; the result of various investigators' as well as my own observations. Numerous normal individuals were carefully examined by means of the tangent screen that was described in the first article of this series, and their Blind Spots compiled to form a general average. Other normal cases were rejected because of faulty responses, high errors of refraction, pathologic conditions of the fundus, etc. Measurements were made upon Dr. Carncross, who has been assisting me for some time, and is thoroughly conversant with this work, as well as upon myself.

Marriotte,[16] [17] [18] the discoverer of the Blind Spot, did not attempt to delineate its outline, but seemed to content himself merely with the proof of its presence. The blind area of each eye was demonstrated by him simply by means of a piece of paper attached to the wall and a movable fixation mark. Assisted by Picard he showed before the king the Blind Spot of both eyes simultaneously. Two equal sized pieces of paper were attached to the wall, three feet apart and at an equal height from the floor. The observer stood twelve feet away and converged upon his thumb, held eight inches in front of the nose. Thus the image of the piece of paper was thrown upon the Blind Spot of the eye upon that side, while the direct image of the paper was concealed from the fovea of the opposite eye by the intervening thumb.

Le Cat[14] attempted to estimate the actual size of the blind area by mathematical deduction from the size of the projected

Blind Spot; but his knowledge of the optical constants of the eye was faulty and the result was too small. Bernouilli[2] made a similar endeavor, with the result that he erred as greatly as Le Cat, but in the opposite direction. His method of outlining the Blind Spot was ingenious. Bending his head forward he dropped a plumb line from one eye, the other being closed. The bottom of this line was used as a fixation mark, and he outlined the Blind Spot by noting the point of disappearance of a coin pushed along the carpet. The result was an elliptical figure.

Hannover and Thomsen,[11] in 1832, were the first to give angular measurements of the Blind Spot that even approached the figures that we now accept as accurate. But the variation they found was so great that accuracy was precluded, probably owing to the methods employed. The measurements given by Griffen,[9] some six years later, were also too large. Donders[6] was probably the first physiologist to correlate the true optical constants of the eye with the actual size of the Blind Spot. His method of measurement was interesting. By means of a plane mirror reflecting a very small candle flame, he illuminated the disc of a normal eye. There was no light perception unless the reflected edge of the flame overstepped the boundaries of the disc. A few observers, however, noted a very faint peripheral luminosity, due to diffusion, at the periphery of the lens. Still fewer had also a very faint sensation of luminosity around the edges of the Blind Spot, probably from vitreous diffusion.

For Donders' calculations, let me refer the reader to the original article or to Helmholtz.[13] Listing's observation agreed closely with those of the preceding author. Coccius[5] repeated Donders'[6] experiment without changing the results in the least.

These were some of the older methods of measurement of the projected size of the Blind Spot. The modern clinical as well as the experimental methods are more accurate. Bardsley[1] made a modification of the ordinary perimeter, adapting it for the plotting of the Blind Spot, and was the first to recognize the importance of not permitting the patient to see any moving object excepting the testing mark. He used the concave section of a hollow sphere, and as a fixation mark a central aperture through which the surgeon could observe whether direct fixation was maintained. The testing mark slid radially in a very narrow groove that was rotated around the fixation aperture by the rotation of the entire concave section. This was used at the ordinary perimetric distance. Berry Haycraft[12] devised a scotometer of the tangent screen type. As a testing mark he used a nail-head moved vertically in a narrow horizontal sliding slit. Direct record of the actual projected size of the Blind Spot was made by impact on cross section paper.

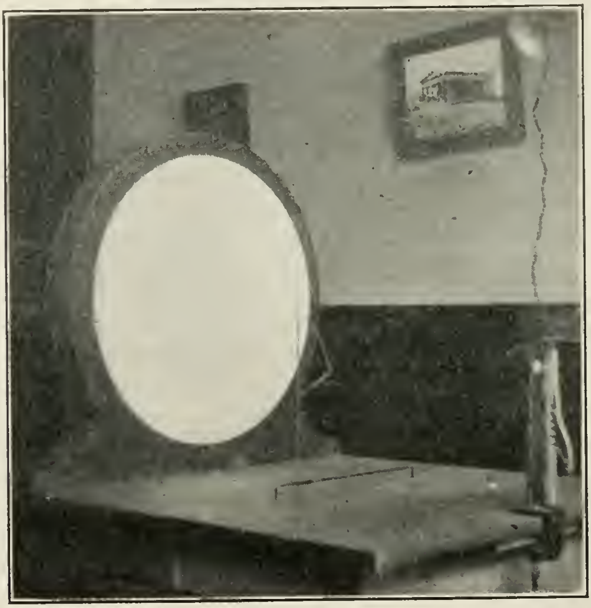


PLATE I.

Front view, showing chin rest, intermediary fixation mark, signal button and tangential screen.

The use of a tangential screen for the measurement of the Blind Spot and central scotomata was first proposed by Bjerrum[4] in 1890. He used a two meter black velvet curtain, situated two meters from the patient, and as test objects, small ivory balls of different sizes on the end of a black rod. With the very smallest balls he was able to delineate accurately the outlines of the Blind Spot, and found them to be slightly larger than if balls of greater diameter were used. This he attributed to "structural imperfections in the immediately surrounding retina." Two years ago, Duane[7] proposed a slight modification of the Bjerrum tangential curtain in order to render it more practicable for clinical application.

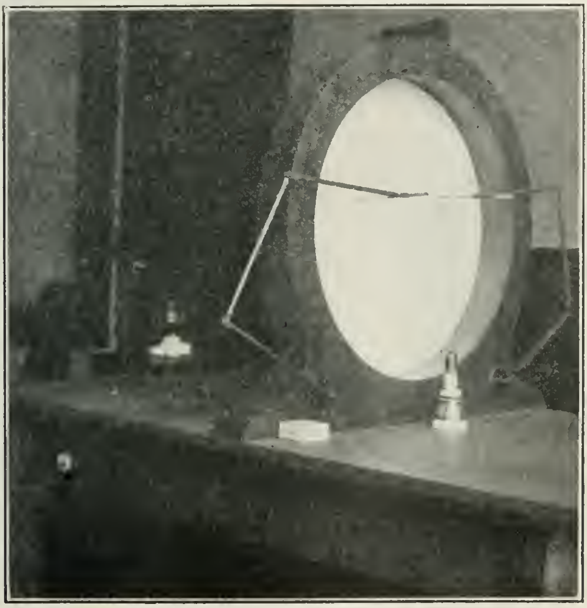


PLATE II.

Rear view, showing rear of tangential screen and solenoid, controlling arms and inner poles, and electric flash lamp.

Priestley Smith[21] devised a scotometer based upon the tangential principle. It consisted of a velvet covered disc, held thirty-five centimeters from the patient's eye. For test objects, small pieces of blotting paper were used, and these adhered to the velvet. The patient fixed upon the center of the disc and the test object was placed upon the ten or twenty degree circle. The disc was then rotated until the object disappeared from view and again reappeared. Thus each meridian was explored until the Blind Spot or central scotoma was outlined. A very slight modification of this was proposed by Sinclair.[20]

The instrument described in the article preceding this[5] has been somewhat modified in order to render it more practicable for routine clinical use. As now completed the instrument which is used for measurement of scotomata within the twenty degree meridian, as well as for the Blind Spot, is as follows (Plates I, II, III):

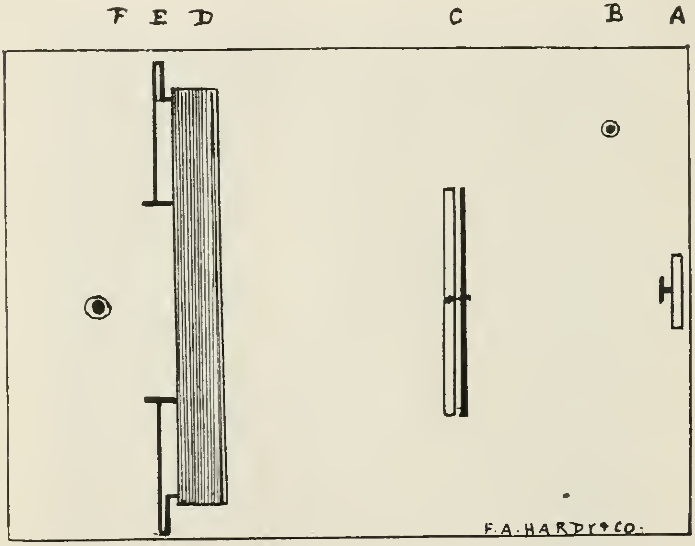


PLATE III.

A—Chin rest.
B—Push button.
C—Intermediary fixation mark.
D—Solenoid, faced with celluloid screen.
E—Inner pole, pencils and controlling arms.
F—Electric flash lamp.

A table about one meter long, on one end an adjustable chin rest; thirty centimeters from this, an upright black rod, two millimeters in diameter, with a slightly larger rounded top; the rod being moved laterally across the table in a groove and being extensible vertically; sixty centimeters from this chin rest a dull-white, round celluloid screen, fifty centimeters in diameter—this is clamped against a ring composed of wound wire connected with the lighting circuit, forming a solenoid; attached to both sides of the bottom of the solenoid are jointed arms bearing steel pencils, one centimeter thick and three centimeters long, the tip resting against the posterior surface of the screen; the posterior surface of the screen is marked by cross lines, one centimeter apart, the vertical ones being numbered and the horizontal ones lettered; at the patient's end of the table is a push button connected with a small electric lamp located behind and below the screen.

In use the patient is seated comfortably on a low stool, the chin resting upon the chin rest. The intermediary fixation mark is moved so that patient gazes across it right near the periphery of the screen. One of the pencils on the end of the jointed arm is then moved so that a blue steel ball bearing, rolling over the anterior surface of the screen and held there by the magnetic force imparted to the pencil, comes into line with the patient's eye and the intermediary fixation mark. The ball bearing becomes a permanent fixation mark and remains in place. Another ball bearing of black or whatever color is to be tested is then put on the anterior surface of the screen and held there by the other pencil. This is the testing mark by which the Blind Spot is outlined. As soon as this disappears from the patient's view, the examiner is signaled by the electric flash lamp, thus avoiding a change in the position of the patient, due to the muscular effort of speech. The position of the tip of the pencil controlling the testing mark is noted in terms of the numbered and lettered lines. After the examination has been completed, the record is plotted out in one-tenth inch cross section paper and filed for observation. (Plate IV.) In connection with this must be noted the exact location of the fixation mark on the screen. The position of the intermediary fixation mark need not be taken into account.

This method of measurement of the Blind Spot permits of its absolute location, irrespective of the position of the patient's head in relation to the tangent screen. For after the head is conveniently fixed upon the chin rest, the eye is sighted over the intermediary localizing spot, and the patient himself directs the position of the fixation mark. Should, for any reason, there be any necessity for changing the position of the head, the presence of the double fixation mark allows of an immediate and accurate reposition. Inasmuch as an eye tires within ten seconds of fixing directly upon a mark, and begins minute lateral excursions, the necessity of rest occurs, particularly in a long drawn-out examination.

The following figures represent a composite normal Blind Spot, based upon the averages obtained from the measurements of thirteen normal cases. The same technic was followed carefully in each case, measuring from the periphery towards the Blind Spot, and the accompanying charts show the wide variations of which I shall speak later. (Plates V to XVII, inclusive.)

Statistics of the composite normal blind spot measured at sixty centimeters distant:

1. *The exact center lies 17.13 centimeters from the point of fixation*—16 degrees, 33 minutes, 32 seconds.
2. The internal border lies 14.13 centimeters from the point of fixation—13 degrees, 15 minutes, 35 seconds.
3. The external border lies 19.68 centimeters from the point of fixation—18 degrees, 9 minutes, 35 seconds.
4. *Thus the horizontal diameter of the Blind Spot measures 5.55 centimeters,* or 4 degrees, 54 minutes.
5. The uppermost border extends 3.223 centimeters above the horizontal line of fixation—2 degrees, 58 minutes.
6. The lowermost border extends 5.169 centimeters below the horizontal line of fixation—4 degrees, 47 minutes.
7. *Thus the vertical diameter of the Blind Spot measures 8.393 centimeters*—7 degrees, 45 minutes.

These do not correspond absolutely with the measurements by other authors, the majority of which were made upon one or two persons and do not represent a general average.

	Listing[15]	Helmholtz[13]	Young (From Helmholtz)	H. S. G.	Griffin[9]
Internal border of Blind Spot to fixation......	12°, 37′, 5″	12°, 25′	12°, 56′	13°, 15′, 35″	......
External border of Blind Spot to fixation......	18°, 33′, 4″	18°, 55′	16°, 1′	18°, 9′, 35″	......
Horizontal diameter of Blind Spot..........	5°, 55′, 9″	6°, 56′	3°, 5′	4°, 54′	7°, 31′

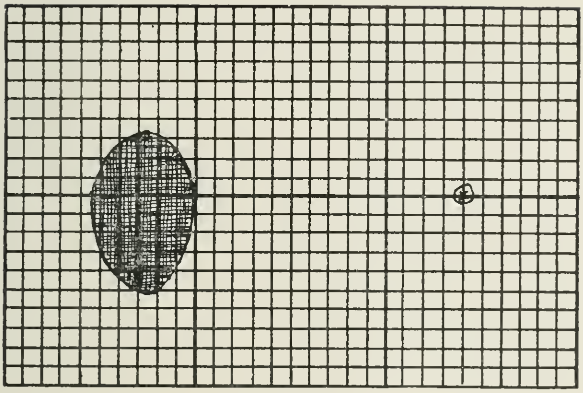


PLATE IV.

Composite Normal Blind Spot.

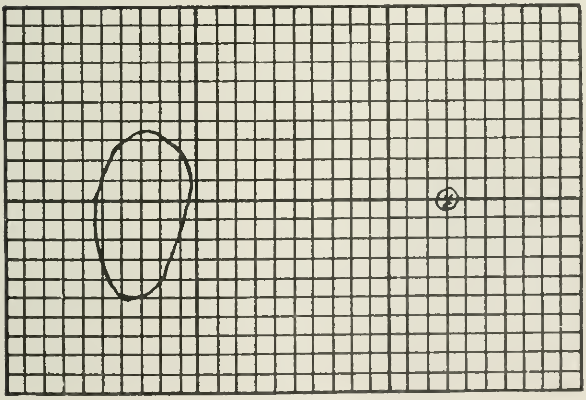


PLATE V.

I. Right eye, normal. 3/8/16.

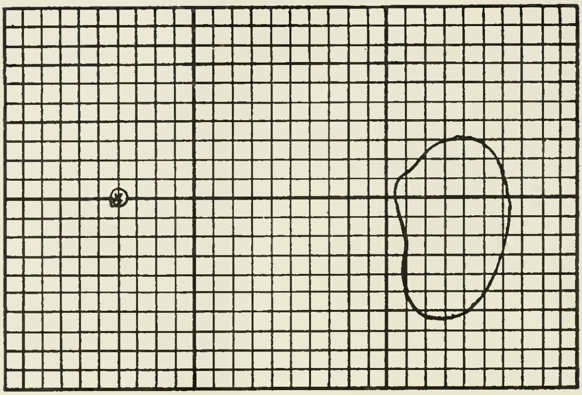


PLATE VI.

II. Left eye, normal. 3/8/16.

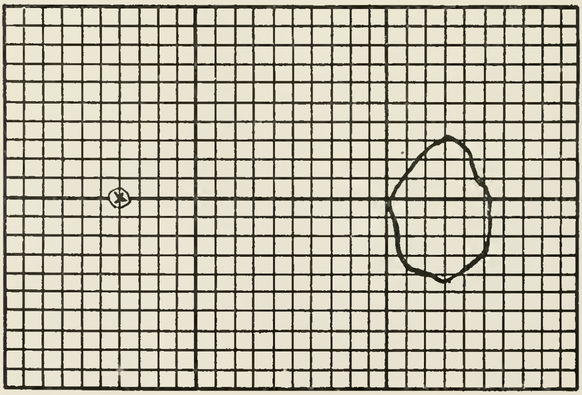


PLATE VII.

III. Left eye, normal. 5/10/16.

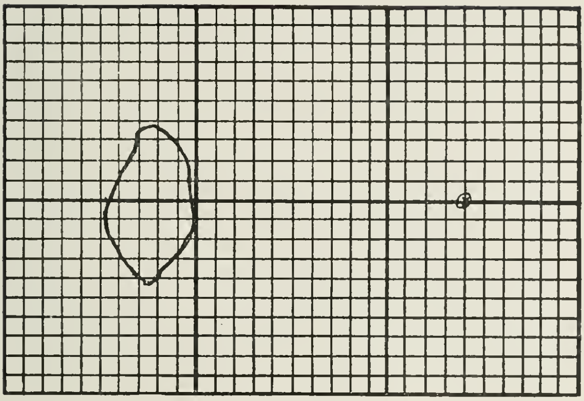


PLATE VIII.

IV. Right eye, normal. 3/10/16.

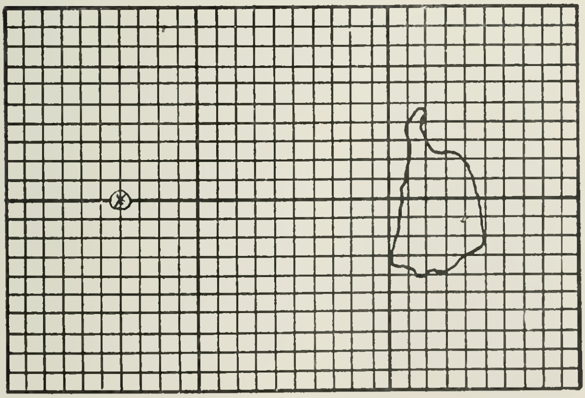


PLATE IX.

V. Left eye, normal. 11/12/14.

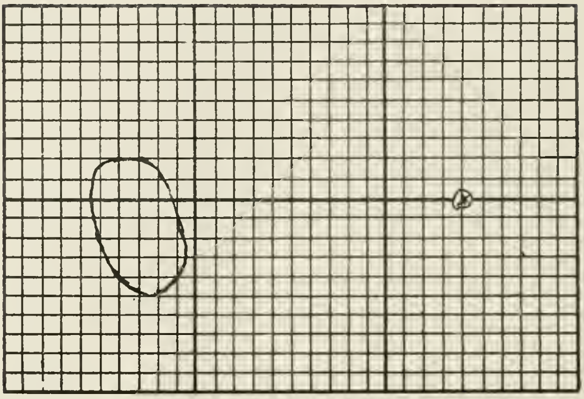


PLATE X.

VI. Right eye, normal. 3/1/16.

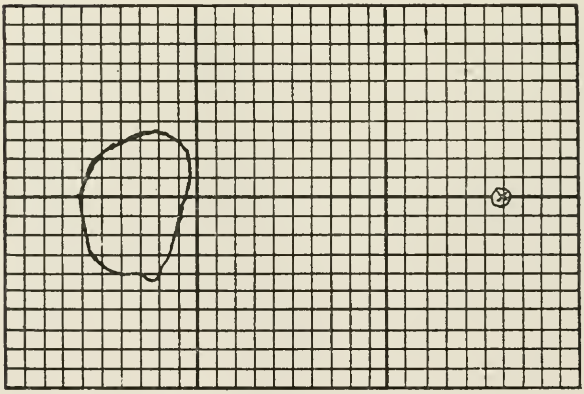


PLATE XI.

VII. Right eye, normal. 2/17/16.

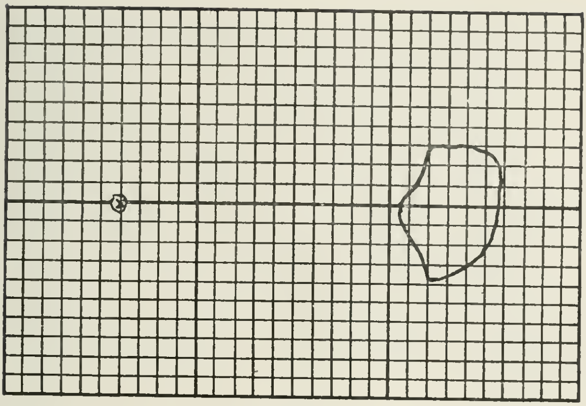


PLATE XII.

VIII. Left eye, normal. 1/27/16.

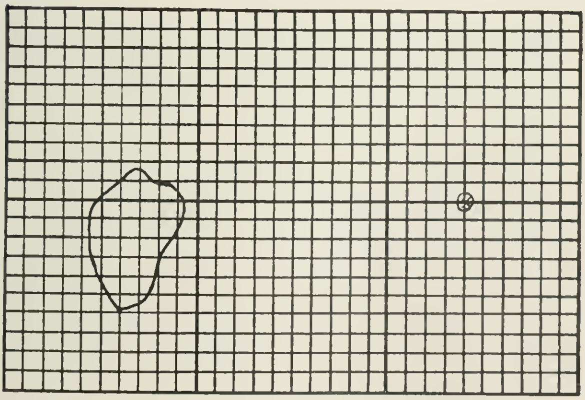


PLATE XIII.

IX. Right eye, normal. 12/16/15.

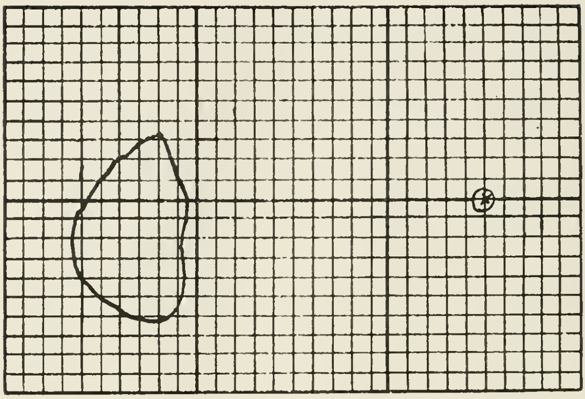


PLATE XIV.

X. Right eye, normal. 11/19/15.

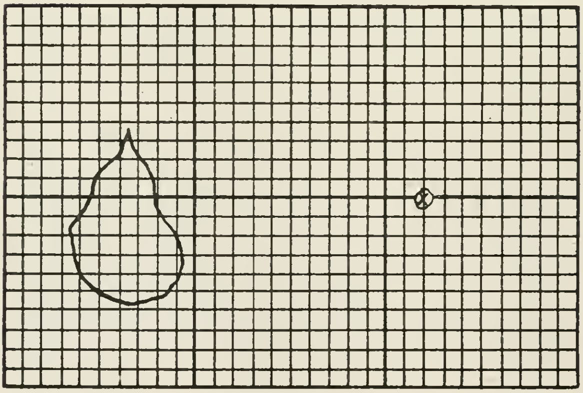


PLATE XV.

XI. Right eye, normal.

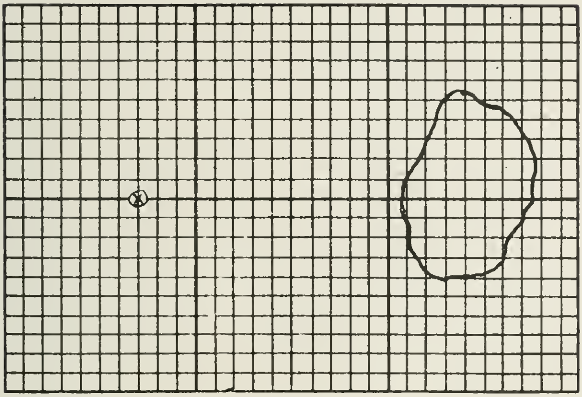


PLATE XVI.

XII. Left eye, normal. 10/29/15.

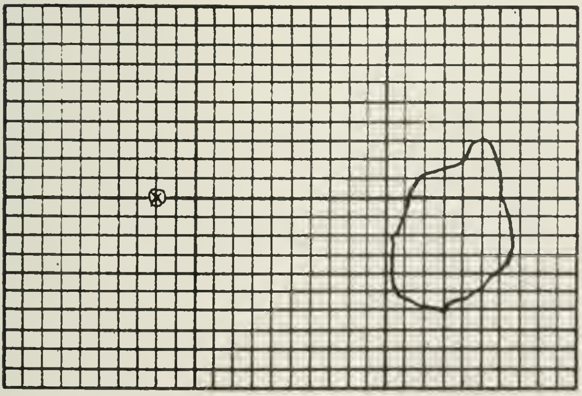


PLATE XVII.

XIII. Left eye, normal. 11/1/15.

Hannover and Thomsen[11] found this latter measurement to vary from 3°, 39′ to 9°, 47′ with an average of 7°, 31′, while Peters[19] measured it 5°, 28′. He found the center of the blind spot to lie 15°, 49′ from the center of fixation, and that the area extended 2° above the horizontal line of fixation and 5° below.

Helmholtz further compared the size of the Blind Spot with the size of a human face at seven feet distance.

The variations of these measurements is not as great as it would seem to be at first blush, because the distance of the testing surface was different with different authors, the methods of measurement varied with the individual, the size of the testing mark was not standardized, and absolute fixation was not always maintained. These factors are of major importance.

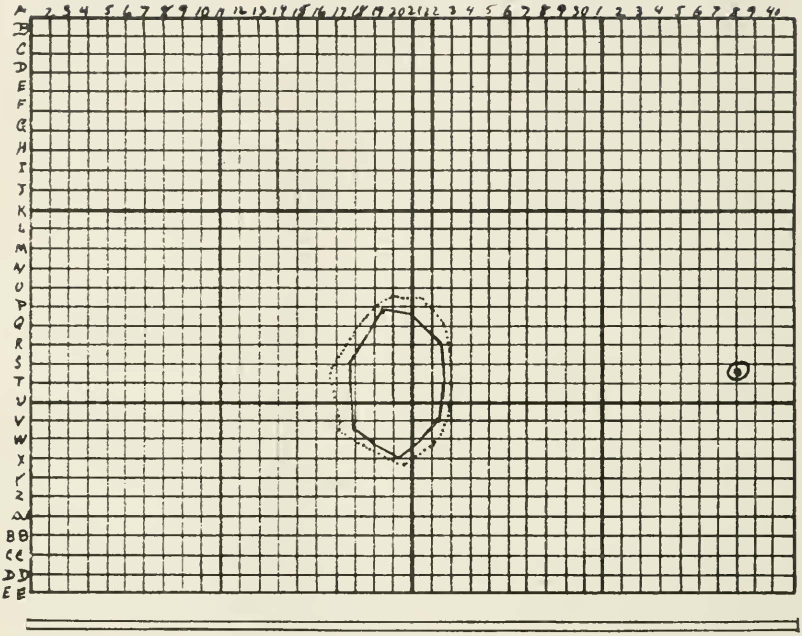
The nearer the testing mark is brought to the patient's eye, the smaller becomes the Blind Spot. In one way this is an advantage, in that it reduces the surrounding neutral zone to a minimum and allows of a sharper definition of the area in question. But these very advantages are retroactive. The time elapsing between the stimulation of the retina by the rays emanating from the testing mark at the exact border of the Blind Spot, and the muscular action resulting in a signal is short; but it is sufficient to allow the testing mark, moved at the usual rate, to pass over several degrees, if the screen be only a short distance from the patient. This results in a measurement either too great or too small, depending upon whether the testing mark is moving away from the Blind Spot or toward it. Furthermore, accurate alignment of the examining screen is much more difficult when the screen is near the patient and minute variations result in greater errors. If the screen be at too great a distance from the patient, inaccuracies in the measurement are apt to creep in from the subjective standpoint. As has been mentioned, the Blind Spot is surrounded by a neutral zone for colors as well as black and white, about one degree in width. The farther the screen is removed from the patient the greater becomes the metric size of this zone, and the more apt are errors in judgment on the part of the patient to occur. Because of these various factors, which I have tested out rather carefully, sixty centimeters seems to be the distance between the screen and the patient which yields the most accurate measurements.

The method of measuring the outline of the Blind Spot would seem to be inconsequential, but in reality it is of major importance. Bardsley and Berry Haycroft (loc. cit.) recognized the importance of the patient concentrating upon the fixation mark and the testing mark, and in their scotometers eliminated all extraneous motion. Every other device has had the drawback of having the testing mark on the end of a very visible rod. It is difficult to maintain absolute fixation without having the attention distracted by a moving object.

Again, one investigator made measurements on a white surface with a black testing mark; another, on a black surface with a white mark; a third utilized a drab gray screen, with either white or black marks. The majority made arc measurements, using a perimeter or the concave section of a hollow sphere, while a few others utilized the Bjerrum tangential screen. My most accurate results came from the use of a dull white tangential screen with a black testing mark.

Each investigator employed the testing mark that seemed most appropriate to himself. There was no standardization in either color or size. I am very much in favor, provided the visual acuity permits thereof, of using a three millimeter dull black testing mark. At the standard distance of sixty centimeters this subtends an angle of zero degrees, seventeen minutes and thirty-eight seconds, or a trifle over two and one-half times the standard angle of normal visual acuity. This is large enough to be prominent in the patient's visual field, but still not so large but that it enters or leaves the blind area promptly and without drag. A size smaller than this is not practical, for it must not be forgotten that we are not dealing with accurate central vision, but with indefinite peripheral vision. Sulzer[22] has shown that the visual acuity at the inner border of the Blind Spot is only one-twenty-second of the central acuity; while at the outer border the acuity is less than one-forty-fifth of the normal. With patients whose vision is less than five-tenths of the normal a ten millimeter testing mark may be used.

Absolute central fixation is extremely difficult to maintain for more than ten seconds. Consequently, a device allowing



⊙ Fixation mark. 38—S.6. H. S. G. Double fixation.

PLATE XVIII.

—— Mark rolled from periphery toward B. S.		....Mark rolled from within B. S. toward periphery	
22.5	R	22.8	R
22.7	T	23.0	T
22.1	V	23.0	V
21.3	W	22.2	W.2
20.1	X	20.7	X.5
19.0	W.2	18.5	W.4
18.0	V.5	17.5	V.5
17.8	S	16.8	S.5
19.5	P.1	17.8	Q.9
21.0	P.4	18.6	P.6
		20.0	O.6
		21.2	O.8
		22.8	Q

of reposition of the eye into its original location is invaluable, for it permits the patient to rest between each measurement. I suggested this over a year ago, and at the last meeting of the American Medical Association, Bissell[3] showed a head rest and double fixation device that seemed to overcome all difficulties in that direction. By using this the patient closes the eye or allows the gaze to wander at will while each measurement is being recorded. The eye then springs back to the original position, which is assured by the double fixation device; for there can be only one position of the eye that brings the fixation mark on the screen and the intermediary fixation mark into direct line. As soon as the patient comprehends this requirement, absolute central fixation is assured.

Variations in the size of the Blind Spot are also dependent upon whether the testing mark is moved towards the area or away from the area. Plate No. XVIII represents the record of a measurement of my own Blind Spot. The unbroken line is the outline as measured by the mark when approaching the area, while the dotted line is the result of the mark advancing from the Blind Spot upon the perceiving retina. This variation is probably due to the persistent after-images or retinal drag. But this factor is practically constant and can be neglected, provided one or the other methods be adopted as the standard. I found quicker responses on the part of the patient (including myself) when the testing mark was carried from the periphery towards the Blind Spot.

As can be seen from the accompanying charts, the Blind Spot seldom forms the regular oval figure that we are accustomed to think of. Greater or less variations in the shape and size are universally present, even with measurements made metrically close together. These are probably due to a varying degree of sensitiveness of the retina, where it borders upon the disc and to the pressure of the vessels at these points. In a few intelligent patients and with great care, it is not difficult to plot off the course of the larger vessels (usually four in number), where they pass on to the perceiving retina. The blind areas resulting from these vessels are usually only relative, but they can be traced several centimeters away from the disc. But in making measurements, no attention need be paid to them.

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ABSTRACTS FROM ENGLISH OPHTHALMIC LITERATURE.

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Ophthalmic Occupational Affections, as Described by Prof. Ramazini, of Modena and Padua, at the End of the Seventeenth Century.

CLEGG, J. GRAY (*Ophthalmoscope*, June, 1916), has gathered all the material bearing on the eyes in Professor Ramazini's book. The work was one of the earliest dealing with occupational diseases, remarkable in its wide scope and thorough description. The article should be read in the original.

W. R. P.

Two Cases of Paralysis of the Sympathetic Associated With Cervical Rib.

MAYOW, M. S. (*Ophthalmoscope*, June, 1916), reports two cases of paralysis of the sympathetic in which the X-ray showed a cervical rib pressing downward towards the first rib and probably attached to it. In both cases the pupil on the same side is smaller than the other, and does not dilate with shading or cocain. Ptosis and diminution of sweating on same side. Also enophthalmus present. Other symptoms, as paralysis of arm and hand, were lacking in these two cases. W. R. P.

Eye Affections Following Experimental Thyroidectomy.

Edmunds, Walter (*Ophthalmoscope,* June, 1916), writes of the eye affections occurring after sixteen experimental thyroid operations.

In several cases a ground glass appearance of the cornea, resembling syphilitic keratitis, was noted, often passing on to ulceration of the cornea, with more or less collapse of the eyeball.

The eye affection generally followed a complete excision of both thyroid and parathyroid glands, but to this there was an exception. The thyroid and parathyroid were excised on one side only, and the thyroid lobe and its parathyroid on the other side left intact, except for the excision of a considerable length of the nerves supplying them. In these animals a greatly higher proportion of eye complications occurred than with the simple total excision operations, and therefore it was inferred that the altered secretion of the thyroid and parathyroids produced by interference with their nerve supply is more inimical to the nutriment of the cornea than the toxins produced by complete excision of the glands.

Similar eye changes have been observed by others. Part of the literature is briefly reviewed. W. R. P.

Some Observations With the Schiotz Tonometer on the Normal Eye.

Hine, M. L. (*Ophthalmoscope,* July, 1916), reports the results of his observations with the Schiötz tonometer on the normal eyes of twenty-six children from ten to sixteen years of age.

As regards the application of the instrument, attention is called to two points. First, that the continued or repeated application of the tonometer mechanically, by its weight, lowers the intraocular pressure definitely in a very short time. Second, faulty results may very readily be obtained by malposition of the tonometer on the cornea.

The observations made were as follows:

1. The intraocular pressure of the normal eye gazing at a fixed spot on the ceiling.

2. The intraocular pressure of the same eye gazing at a finger held twelve inches from the nose.

3. The intraocular pressure of the same eye under the influence of eserin.

4. The intraocular pressure of normal eyes at varying intervals after the removal of a pressure bandage.

The findings are tabulated in detail:

1. The normal intraocular pressure was found to vary from 18.5 millimeters Hg. to 29.5 millimeters Hg., the mean being 23.5 millimeters Hg.

2. The intraocular pressure during convergence was found to be increased in all cases in which a reliable reading could be taken by an amount varying from 2 millimeters to 10.5 millimeters Hg., the mean being 4.9 millimeters Hg.

The possibility of alteration in the tension during accommodation has been eliminated by the work of other observers, and the writer therefore concludes that the rise in pressure in his own cases was due to convergence alone.

3. The intraocular pressure of eyes under the influence of eserin was found, in twenty-two out of the twenty-six cases to be diminished by an amount varying from 2.25 millimeters to 7.25 millimeters Hg., the mean being 4.6 millimeters Hg., while in the remaining four cases it was unaltered.

4. The intraocular pressure of normal eyes, after the application of a pressure bandage, was naturally found to vary very considerably, according to the amount of pressure applied to the eyeball.

An application of an hour and a half was found quite as efficacious in lowering the pressure as one continued for six hours, and that the normal level was regained in from twenty-five to sixty minutes.

As regards the rise of intraocular pressure during convergence, the writer's results seem to supply proof of the compression of the globe by the extrinsic muscles during close work, and may be an important factor in the production of myopia, especially in children with weak sclerotics.

W. R. P.

A Suggestion as to the Causes of Myopia.

Wood, Arthur (*Ophthalmoscope,* July, 1916), puts forward the suggestion that the difference in the ciliary muscles of the myope and the hypermetrope is the cause of myopia, and that this difference is transmitted as an hereditary defect.

The ciliary muscle is composed of two parts, the outer meridional, Brücke's muscle, and the inner, Müller's muscle. Both are made up of unstriped fibers, the former more developed in myopic eyes and the latter more in hypermetropic eyes.

Müller's muscle constitutes about one-tenth of the ciliary muscle in the emmetropic eye, one-third in the hypermetropic eye, whilst in the myopic eye it is deficient or entirely absent.

This difference in the condition of Müller's muscle is present at birth.

Contraction of the longitudinal fibers of the ciliary muscles exerts a suctional force upon the fluid in the space of Fontana, so that there is a stream flowing from the anterior chamber into the suprachoroidal spaces during the act of accommodation. In the myope cessation of accommodation causes the pumping action to become less and less. In those eyes possessing the circular bundle, its action during accommodation is to drag the ciliary body inwards, thus widening the angle of the anterior chamber, and at the same time it will cause the alveoli in the pectinate ligament to become more spherical, thereby allowing more fluid to flow through. In the myope, where this bundle is deficient, this action is correspondingly less and less until it is nil in the case of those eyes where it is entirely absent. Not only is there absence of these functions, but there is no counteraction of the effect produced by the radial and longitudinal fibers when they pull the ciliary body forward and outward, thus lessening the angle of the anterior chamber.

The action of the circular fibers also is that of a pump during the contraction and relaxation necessitated by the act of accommodation.

Since there seems to be a general agreement amongst observers that the difference in structure of the muscle is present at birth, it may be taken that it is not the result of disease, of mechanical pressure, or disuse, but due to hereditary transmission of the defect from parent to child.

Domec urged the use of pressure massage, used in combination with miotics and the wearing of fully correcting glasses, as a means of arresting the development of myopia. The explanation offered was that the aqueous, driven into the sinuses by the slow pressure, dilates the natural passages, so that a larger quantity of intraocular fluid is excreted each time than usual. During the treatment the zonule becomes more elastic and the ciliary muscle stronger. The writer considers this explanation to be the key to the question as to how myopia becomes stationary.

The theory that myopia is due to close work aggravated by town life and badly lighted rooms is gradually giving ground before statistics. The figures given by Arnold Lawson are quoted, where in the Aldenham and St. Jude's schools the percentage of myopia was actually five per cent higher in the better lighted and ventilated school.

In the case of monocular myopia, the sound eye has a ciliary muscle, with Müller's bundle properly developed, the myopic eye is deficient in Müller's bundle, and as a consequence there is not the same machinery for promoting the normal flow of aqueous. Here there is no need to invoke causes which must act equally on both eyes to explain the disease being present in one eye only.

A case of twins is mentioned. They were of the same sex, and almost of similar appearance, and are evidently the product of one ovum. They have nearly the same amount of myopia, and the grounds of the fundus are exactly alike. This is easily explainable by the theory that the muscles were alike and that in them the circular fibers were of the same volume.

Racial myopia has long been a subject of discussion, especially from the point of occupation. The writer suggests that it has far more significance when approached from the hereditary side, and is more satisfactorily explained by a congenital defect transmitted from parent to child. W. R. P.

Contusion Hypotony.

Collins, E. Treacher (*Ophthalmoscope*, July, 1916). This paper deals with that form of hypotony which occurs after contusions of the eyeball, in which no perforation of its coats has taken place.

In the majority of cases normal tension becomes restored in the course of a few days, in others, not for several weeks, and in some cases it has remained so long that it appeared probable it would be a permanent defect. One of the chief purposes of this paper is to show that there are several different ways in which a contusion of the eye may result in lowered intracranial tension. They are considered under the following headings:

1. Diminished secretion: (a) from nerve inhibition; (b) from vascular disturbance; (c) from epithelial damage.

2. Increased excretion: (a) through normal channels; (b) through newformed channels.

While it is possible that hypotony following contusion of the eye may be due to arrested formation of intraocular fluid through nerve inhibition, it cannot as yet be regarded as definitely proved.

Judging from the effects on the tension of the eye of removal of the superior cervical sympathetic ganglion in cases seen clinically, the hypotony, if so produced, would not be permanent, and probably of not more than a few weeks' duration.

The ciliary body derives its blood supply from two sets of arteries: the two long posterior ciliary arteries, and the anterior ciliary arteries.

Either of these sources of vascular supply might be interfered with as the result of a contusion of the eye.

The whole of the blood supply to the ciliary body from the posterior ciliary arteries may be cut off, by division of those vessels as they enter the globe, without any diminution in the tension of the eye taking place. Illustrative of this is a case of the writer's which had the operation of opticociliary neurotomy performed for the relief of pain in absolute glaucoma in which the posterior ciliary arteries must have been divided. Both had to be excised two years later on account of return of pain; and in both the glaucoma has persisted since the operation.

A second case had an intradural tumor of the optic nerve removed with the retention of the eyeball. The long posterior ciliary arteries were cut. No diminution of tension was found to occur.

That the anterior ciliary arteries may become torn across in contusion of the eyeball with diminution of tension, is definitely proved by the following case: A boy received a contusion injury of the right eye from falling fireworks. The eye showed hazy cornea, deep anterior chamber, hyphema, one-third iris visible. Tension, minus one. Vision equaled hand movement.

The excised eye showed an imperforated globe, complete cyclodialysis, which had caused rupture of the anterior ciliary arteries, and the formation of an extensive blood clot in the enlarged anterior chamber. The ciliary body in this way must have been deprived of a considerable part of its blood supply and unable to form the intraocular fluid. Hence a condition of hypotony became established.

Another similar case of the writer's and one described by Ogilvie are cited, in both of which occurred cyclodialysis and rupture of the anterior ciliary arteries with extensive hemorrhage into the anterior chamber and minus tension.

If the epithelial lining of the ciliary body, as its arrangement suggests, has the function of secreting the aqueous humor, it is conceivable that a contusion of the eye might produce a direct inhibitory action on the cells themselves; so causing arrest of secretion and hypotony. There is, however, as yet not sufficient evidence as to the real function of these cells to enable us to verify the truth of such an hypothesis.

Where a contusion injury is of sufficient force to detach the pars ciliaris retinæ, there are always other lesions to which the resulting hypotony might be attributed. It is impossible, therefore, to say definitely what influence a detachment of the pars ciliaris retinæ alone has on the intraocular tension, although it would seem highly probable, that so extensive a change in the part of the eye from which the intraocular fluid is derived would tend to arrest its formation.

Increased excretion through normal channels has been shown to be possible experimentally. The normal channels of exit for the intraocular fluid are capable of adapting themselves to an increased rate of excretion, and if this rate of excretion can be produced by prolonged gentle pressure on the eyeball, it seems likely that a short violent compression might act in a similar way.

Hypotony so produced by contusion of the eye would probably be of only short duration, at the most not lasting more than a few days, and certainly not being permanent.

The operation of sclerocorneal trephining by removing a circular piece of Descemet's membrane, is one of the most effectual ways in which a permanent gap may be established in the endothelial lining of Descemet's membrane, with resultant hypotony. Verhoeff recently examined microscopically a filtration scar in an eye excised fifty-two days after sclerectomy. No endothelium was found lining the inner surface of the edematous tissue through which filtration was taking place.

The case of a boy is cited, six years old, who, two and a half years previously, had run against a lamp post, striking his left brow. Examination showed vision of left eye 6/60, not improved by glasses. Tension, minus two. Conjunctiva edematous above cornea and a little to the outer side.

The appearances of this case were very similar to those seen after a sclerocorneal trephining, although no perforating wound had been inflicted. It is most likely an internal scleral rupture without adhesion of the iris, and one in which an area would have been left at the periphery of the cornea unlined by endothelium, through which filtration of the aqueous would take place, causing an edematous condition of the overlying conjunctiva and hypotony.

Rupture of the ligamentum pectinatum occurring in contusions of the eye, especially of those fibers which curl around the angle of the anterior chamber to go to the root of the iris, the socalled pillars of the iris, results in the ciliary muscle becoming split in the entire or in only part of the circumference of the anterior chamber. The writer has found it pathologically several times, associated with hypotony clinically. The rupture of the bonds of union between the root of the iris and the periphery of the cornea must considerably facilitate the passage of the intraocular fluid into the canal of Schlemm, and so tend to lower tension; much in the same way as the instillation of eserin, by facilitating excretion, lowers tension.

Two cases occurring in soldiers are cited, in both of which the hypotony was best accounted for by increased excretion, due to the greater facility with which the aqueous could find access to the canal of Schlemm from rupture of the pectinate ligament.

The eye of one of these cases was examined pathologically and showed rupture of the ligamentum pectinatum over a limited area, without rupture of the anterior ciliary arteries.

Another way in which contusion of the eye may produce a newformed channel of escape of the aqueous humor from the anterior chamber is by rupture of Descemet's membrane. Such ruptures have been shown to occur by Thompson and Buchanan at the time of birth, usually from instrumental delivery.

Hypotony resulting from such a lesion would only be of temporary duration. Hypotony caused by the other conditions, internal scleral rupture, or rupture of the pillars of the iris and ciliary muscle, might be permanent. Separation of the structures severed in these injuries is wider, and the chance of them becoming covered by endothelium less probable.

CONCLUSIONS.

1. That hypotony following contusion of the eyeball may be due to different causes, and that more than one cause may be present at the same time.

2. When of short duration, it is probably due to an increased rate of excretion of the intraocular fluid through the expanded normal channels of exit; or, possibly, to some arrest of secretion from paresis of the vasoconstrictor nerves.

3. When of long duration, it may be due to:

(a) The formation of new channels of exit for the intraocular fluid from the anterior chamber, either from an internal scleral rupture of the pectinate ligament; or

(b) The cutting off of blood supply to the ciliary body from rupture of the anterior ciliary arteries;

(c) Or possibly the detachment of the pars ciliaris retinæ.

4. If accompanied by extensive hemorrhage into the anterior chamber, either the canal of Schlemm has been opened up by an internal scleral rupture or the anterior ciliary arteries has been torn across from cyclodialysis.

5. If, when the blood has cleared away, a portion of the iris has disappeared from view, as though an iridectomy had been

done, then there has been cyclodialysis with rupture of the anterior ciliary arteries.

6. If, in course of time, a translucent area appears just outside the sclerocorneal margin, like that seen in a cystoid cicatrix, then there has been an incomplete internal rupture.

7. If the anterior chamber, without extensive hemorrhage into it, becomes markedly deepened in the whole or part of its circumference, there has probably been a rupture of the ligamentum pectinatum, limited to the pillars of the iris, and of the ciliary muscle, prolonging the angle of the anterior chamber outwards.

8. If the lens is dislocated laterally, and the retina detached, the vitreous humor has probably come forward into the circumlental space, and may have dragged the pars ciliaris retinæ away from the pigment epithelium. W. R. P.

On Dislocating and Replacing of the Eyeball.

Redslolo, E. (*The American Journal of Ophthalmology*, July, 1916), reports a case of dislocation into the antrum of Highmore of the right eye. The patient, a man forty-eight years old, was struck in the right eye by the horn of a cow. On examination under an anesthetic the orbit was found empty and the eyeball was discovered, cornea downward, in the maxillary antrum. The conjunctiva was cleanly separated all around the limbus, and all the muscles were torn loose from the globe, the optic nerve remaining intact. The globe was replaced in the orbit and fastened by sutures. The cornea showed striped opacities, the pupil was dilated and inactive and there was no fundus reflex.

The eyeball regained limited mobility and the media became clear after five months. Ophthalmoscopic examination at this time showed the nerve atrophic and a choroidal rupture in the macular region. Vision was completely lost.

The author then reviews the literature on the subject of dislocation of the eyeball. E. C. E.

On Secondary Glaucoma.

Abadie (*The American Journal of Ophthalmology*, July, 1916) maintains that secondary glaucoma is much more frequent than is generally supposed, and that it is often not recognized. It is essential to differentiate between true glaucoma and secondary glaucoma, because the treatment of the two classes of cases differs widely. The diagnosis is easy when there is a well defined inflammation of the anterior third of the eyeball, but difficult when this inflammation is so mild as to pass unnoticed. The most peripheric parts of the retina and choroid must be carefully inspected, and the pupillary margin must be examined for traces of exudate.

Operation on these secondary cases without constitutional treatment is unsatisfactory. The author holds that surgery should take second place in the treatment of these conditions. Iridochoroiditis and chorioretinitis are the diseases which most frequently provoke secondary glaucoma, and the general treatment must be appropriate to the specific etiology of the affection.

Infantile glaucoma is always secondary and should have a general treatment. The author has cured or arrested the development of all his late cases by prolonged mercurial treatment.

E. C. E.

The Treatment of Glaucoma.

Beem, Ione F. (*The Journal of Ophthalmology and Oto-Laryngology,* July, 1916), reviews the treatment of glaucoma by medicine and by the various operations for the relief of tension. The author then cites a number of cases of late infection following the trephine operation, and recommends the Smith iridectomy as an operation giving good results and free from the danger of late infection.

The incision in this case is made in the sclerotic with a cataract knife. The iris protrudes through this incision voluntarily or can be made to do so by slight pressure on the posterior lip of the wound. The iris hernia is then grasped by forceps and iridectomy is performed by two cuts with scissors. This operation allows one to remove the segment of iris at the root, and gives a firm cicatrix.

E. C. E.

Leucosarcoma of the Choroid—Report of a Case.

Moulton, H. (*Southern Medical Journal,* August, 1916), notes the rarity of leucosarcoma of the choroid, and especially of those seen in the first stage. He then reports a case in a man fifty-eight years old in which the tumor had given symptoms for two months. The growth occupied about one-fifth of the vitreous chamber. The tension was normal, but the pupil was slightly dilated and did not react to light. The eye was enucleated and microscopically the tumor proved to be a small spindle celled sarcoma without pigment.

E. C. E.

Tabetic Ocular Crises.

Spiller, Wm. G. (*Journal American Medical Association,* March 18, 1916). Ocular crises were first described by Pell in 1898, but have not been generally recognized and only a few cases are recorded. The symptoms have been described as severe pain in the eyes, secretion of tears, spasm of the orbicular muscles, and hyperesthesia of the eyes and parts about the eyes. Several cases are quoted from the literature and symptoms described in detail. The author reports a case of tabes in a colored person who has suffered from attacks of pain in the eyes and adjoining parts for the past fifteen years. During the attacks of ocular pain, peculiar visual phenomena developed. "He described them as flashes of light, twisting and assuming the shape of reptiles, birds, houses, men, various forms of animals, etc." E. S. T.

Injury to Eye From Explosion of Golf Ball.

Bernstein, Edward J. (*Journal American Medical Association,* April 22, 1916), reports a case of burn similar in most respects to those already reported. The patient was a child of twelve years. There was great edema of the conjunctiva, with swelling of the lids, but the eye finally recovered with only a slight central leukoma. Fourteen references are given.

E. S. T.

Bruit Over the Eyeball in Exophthalmic Goiter.

Reisman, David (*Journal American Medical Association,* April 29, 1916). About two years ago the author saw a young girl with exophthalmic goiter. A loud bruit synchronous with the beat of the heart was heard on placing the stethoscope over the eyeball. Mention of this symptom occurs in the literature, but it has not been frequently observed. The bruit, like other signs of exophthalmic goiter, is not constant in all cases.

E. S. T.

The Etiology of Iritis.

IRONS, ERNEST E., AND BROWN, E. V. L. (*Journal American Medical Association*, June 10, 1916). This study was undertaken primarily to determine the causes of the socalled rheumatic iritis. One hundred patients have been studied. Careful attention was given to the history, and a complete physical examination made to detect the presence of syphilis, tuberculosis, gonococcal infection, and infections of teeth, tonsils, sinuses, prostate, pelvis or other structures which might give rise to lesions in joints or eyes. Laboratory examinations included Wassermann tests controlled by two laboratories, complement fixation tests for gonococcal infection, roentgenograms of teeth and sinuses, and of the lungs when there was any question of pulmonary disease, and cultures of pus from tonsils, sinuses, prostate and other infected tissues. Tuberculin tests, one, three, five and ten milligrams being used, were made in suitable cases. The causes, as found, are tabulated below:

Infections	Alone	With other infections	Total
Syphilis	10	13	23
Gonococcal infection	7	2	9
Tuberculosis	8	..	8
Dental infection	7	11	18
Tonsillar infection	7	9	16
Sinus infection	1	2	3
Genitourinary (nonvenereal)	3	..	3
Other infections	2	..	2
No cause found	1	..	1
Combined infections	..	..	17

Following the tabulation a number of interesting observations are made concerning the different types of infection. Under dental infection, the author has remarked that infections about the teeth occur in a large proportion of all persons, and care must be exercised in ascribing to such infections a causal rôle when they happen to be found in the subjects of iritis or other metastatic lesions. The paper concludes with the following observation: "From our clinical study and from our experiments thus far, it would appear that not one but several factors are concerned in the production of iritis, among which may be noted the presence of a focus of infection in which bacteria may live and multiply, partially protected from the resisting forces of the host; the periodic entrance into the blood stream of these organisms and their lodgment in the eye, either by reason of their great number, as in sepsis, or by fortuitous embolism; changes in the eye itself, either in vascular anastomoses, or in susceptibility of the ocular tissues owing to previous injury; and finally changes in the organism itself, whereby it becomes better able for a time to maintain itself in the tissues of the eye. Such adaptations on the part of the organism do not necessarily imply any demonstrable change in its morphology or cultural reactions." E. S. T.

ABSTRACTS FROM GERMAN OPHTHALMIC LITERATURE.

BY

Frank C. Todd, M. D.,

MINNEAPOLIS.

J. W. Charles, M. D.,

ST. LOUIS.

Max W. Jacobs, M. D.,

ST. LOUIS.

Harry S. Gradle, M. D.,

CHICAGO.

Hans Barkan, M. D.,

SAN FRANCISCO.

New Observations of Circulatory Movements in the Living Eye and Other Organs and Their Measurement.

Troncoso (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). 1. The Leber method for measuring filtration in the dead eye must be abandoned, as it is founded on the false assumption that the amount of liquid injected into the anterior chamber equals the amount which passes off through the anterior ciliary veins.

2. In order to ascertain whether a current of lymphatic elimination from the eye exists and to measure same the living eye must be utilized.

3. In rabbits the steady outflow of lymph from the interior of the eye through the anterior ciliary veins and through numerous vessels in the entire circumference of the cornea can readily be demonstrated if the conjunctiva is dissected from the limbus, the muscle tendons severed, and the eyé, luxated from the orbit, placed in a receiving vessel filled with oil.

4. The drop of blood and lymph which accumulate in the oil are subjected to centrifugation. For comparison blood taken from the ear of the animal is also centrifugated. In the filtrate from the eye the amount of supernatant clear fluid is two and even three times as large as the clot; in the blood the serum represents only one-third of the coagulum. Therefore, a large amount of lymph has been added to the blood.

5. The average of a series showed lymphatic excretion of three and one-half millimeters per minute from the cameral angle of rabbits.

6. It is not true that, as Weiss has asserted, a similar result can be gotten at any other location. In the testicle, in which similar methods could be used because of anatomic conditions, the following was found:

(a) Lymphatic excretion through the vessels of the subcutaneous tissue cut at right angles is six millimeters or less per minute. (b) Excretion through the vessels as deep as those of the cremaster fascia is also negligible and equals that of the previously mentioned layer. (c) On opening the serous capsule and immersing the testicle in oil, a continuous discharge of lymph can be observed in the space between testicle and epididymus. The discharge of lymph is continuous, as in the eye. This fact can be proven in two ways; either by removal of the drops with a sound and noting the appearance of a new supply, or by measuring the amount of discharge through equal periods.

7. The average amount of lymph excretion in the serous sac of rabbits was 3.6 millimeters per minute, in dogs twelve millimeters per minute.

8. These experiments show that the chambers of the eye are similar to serosæ; for there is in both a constant lymph stream whose behavior is the same in the eye and the sheath of the testicle.

9. The canal of Schlemm is not a venous sinus, as Leber asserts, but a lymph canal. If it contained blood, drops of blood would exude from the several branches, since all of the fine perforating vessels of the corneoscleral limbus communicate with same. Since the fluid which comes from it is almost pure lymph, the canal must contain pure lymph in its natural state.

10. The draining vessels of the canal of Schlemm, which perforate the sclera and approach the limbus, must be considered lymph vessels, since they are simple endothelial tubes through which lymph is discharged. Other branches bring Schlemm's canal into communication with the anterior ciliary veins, although this connection is only a precautionary act of nature in order to make possible the outflow of lymph when the ocular tension suddenly rises.

11. Blood pressure in the veins of the iris is greater than the intraocular pressure, from which we must not assume that the discharge of aqueous takes place through them. In the anterior ciliary veins the pressure while they pass through the sclera must, on the contrary, be less than that in the anterior chamber and Schlemm's canal.

12. When the intraocular tension suddenly rises and becomes higher than that of the iris veins outflowing, the venous system can provide an outflow until the intraocular tension reaches the normal. M. W. J.

The Significance of Preservation of the Macula in Hemianopic Visual Fields Form the Standpoint of Brain Localization.

LENZ (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) came to the conclusion in a previous article that the assumption that both visual centers share in the supply of the macula may explain the persistence of same when a complete hemianopsia exists. Lenz does not accept Wilbrand's theory that this double supply occurs through division of fibers in the chiasm, but rather that of Heine, who assumed, from his study of stereoscopic vision, that it is due to the presence of commissures running through the corpus collosum. The middle of the parietal lobe was found to be the area in which branching occurs, and as a consequence, assuming complete section of the visual tract, preservation of the macula can only take place when the lesion lies centrally from the middle of the parietal lobe. If the lesion lies peripherally from this point, half of the macula area must fall out—i. e., the line of division must pass directly through the point of fixation. In lesions of the optic tract, in the vast majority of cases we find no typical preservation of the macula, and it may be added that no case exists where, having such preservation, a complete break in the path of transmission was proved.

Where lesions of the visual centers exist, the macular integrity has long been a scarcely questioned fact. The verification of the presence of a typical macular preservation points, in Lenz's opinion, to the utmost probability of a lesion of the central portion of the visual path. Further observations tend to substantiate the earlier findings. M. W. J.

Scotoma Formation and the Significance of Lumbar Puncture in Luetic Affection of the Opticus.

Igersheimer (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). Pathogenetically, for the appearance of central or paracentral scotomata in leutic inflammation of the optic nerve, we must consider: 1. Inflammatory processes arising in the nerve parenchyma of the chiasma and extending into the cranial portion of opticus. 2. Inflammatory processes of the orbital opticus sheath with extension to the temporally lying papillomacular bundle. In both cases we are dealing primarily with a specific inflammation of the central nervous system, mostly a basal meningitis. Ring scotomata in lues are usually attributed to a uveitis, but Igersheimer calls attention to the fact that the opticus may be the causal factor.

When we are dealing with a luetic optic nerve affection which proceeds with central or paracentral scotoma formation, it is necessary to search for symptoms of lues cerebri. The central nervous system is more frequently involved than we suppose in cases where we find scotoma formation in optic nerve disease, and lumbar puncture often provides us in the pathologic liquor with our only evidence that the central nervous system is involved. M. W. J.

A Case of Membrana Pupillaris and Capsulopupillaris Persistens With Cataracta Polaris Anterior, at the Same Time a Contribution to the Pathologic Anatomy and Pathogenesis of Hydrophthalmus Congenitus.

Böhm (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914), describes in detail the various anomalies found in his case, which he presents as corroborative evidence for the theory that hydropthalmus congenitus is due primarily to congenital anomalies. He found, in addition to pathologic changes in the cameral angle, remains of the embryonic vascular system of the lens. A large anterior polar cataract was also present. This condition, together with membrana pupillaris persistens and capsulopupillaris in hydrophthalmus, has hitherto never been reported. M. W. J.

Megalocornea.

Staehli (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) describes four cases which demonstrate that there is a typical and unassailable megalocornea. Whether such are to be considered cases of halted hydrophthalmus or of giantism restricted to one organ, is the question. Staehli believes we are dealing with a partial hyperplasia, a partial giant growth. The condition has nothing to do with infantile glaucoma. That we are dealing with a morbid condition is evidenced by the early spontaneous dislocation of the lens, the early arcus senilis like opacities of the cornea, the washing out of iris pigment and deposit of same on posterior corneal wall. M. W. J.

Slit Pupil in Man.

Tamamscheff (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) points out that in previously reported cases the following was determined:

1. Course of the slit from inwardly nasal to temporally upward in forty-five per cent of cases.

2. Gray circumpupillary zone in contrast to brown color of rest of iris. Clinical picture and embryologic conditions lead to following conclusions:

1. Slit like pupil is the result of two atypical colobomata that can be bought into connection with four indentations described in the embryo by v. Szily. The notches which are seen earliest and which are most marked correspond with the ends of the slit, as described in the forty-five per cent of cases just mentioned.

3. Abnormal resorptive conditions of the mesoderm appear to bear a large part in the development of this deformity. Tamamscheff's patient suffered with juvenile glaucoma, a hereditary condition in twenty per cent of cases reported, and due to abnormalities of development. M. W. J.

Saturation of Cornea With Blood.

Kusama (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) examined a piece of cornea from a boy who had suffered an injury accompanied by hemorrhage into the anterior chamber four months previously. He found the typical oval bodies described by others, which have proven resistant to all known stains. On the hypothesis that these might be melanin bodies, chlorin, peroxid of hydrogen, kali permanganate and oxalic acid were used as possible solvents. These were the results:

1. All chlorin solutions were inert.
2. Dipping sections for two weeks in undiluted peroxid of hydrogen in the dark caused absolute disappearance of such bodies.
3. By means of the depigmentation method with potassium permanganate, according to Alfieri (section remains in the solution of permanganate one to one thousand for five days), the bodies disappeared absolutely.

He therefore believes that these bodies in all probability arise as follows: The blood in the anterior chamber loses its normal form and the hemoglobin set free from the red cells penetrates the corneal parenchyma by diffusion. There gradually the hemosiderin and later, after elimination of the iron, these peculiar bodies are developed. The latter belong to the group of Unna's melanosiderin. M. W. J.

Diffuse (Epibulbar and Palpebral) Carcinosis of the Conjunctiva.

McBurney (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). 1. Squamous cell epithelioma originating at lower limbus.

2. The growth had begun to perforate along the ciliary vessels.

3. Marked reaction in all parts of the eyeball, as was to be expected in so diffuse a growth.

4. Pressure of tumor produced a marked ectasia of bulbus wall.

5. Possibility of early perforation at limbus in tumors, if of carcinomatous nature.

Exenteration of orbit under local anesthesia. Recapitulation of cases in the literature. M. W. J.

Preretinal Sarcoma of Choroid (Early Perforation of the Undetached Retina).

Berg (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) describes a tumor which perforated the retina and then developed preretinally. The retina was not detached. Clinically the mass resembled a cysticercus. The patient was a thirty-nine-year-old female. There is only one other case of this kind in the literature. Histologic report is given. M. W. J.

Pathologic Anatomy of Metastatic Carcinoma of Choroid.

Ishihara (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). 1. Metastatic stratified epithelial cancer in cancer of esophagus. Ishihara found evidence of continuous growth of the metastatic carcinoma in the blood vessels as well as in the lymph spaces. Only one other case of stratified epithelial carcinoma of choroid has been histologically recorded.

2. Multiple isolated, carcinomatous capillary emboli of the choroid. Patient was operated on five weeks before eye symptoms appeared, for cancer of breast. M. W. J.

An Up-to-the-Present Unknown Tumor of the Conjunctiva (Russel's Bodies Tumor.)

Komoto (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). A flat, lobulated grayish firm tumor of the retrotarsal fold of the conjunctiva, made up almost entirely of intra- and extracellularly placed globules of various sizes. The arrangement is mulberry like and the cells acidophilic. Komoto describes Russel's bodies as follows: Strongly refractive, round, clear cut globules of hyalin material which stain strongly with anilin dyes and which are of from staphylococcus to plasma cell size. They are partly intra-, partly extracellular, and are arranged in mulberry or grape-like masses. The tumor resembles the picture of pseudotuberculosis, and is probably the result of irritation from a foreign body. Entire fields were full of the Russel bodies, which prompts Komoto to call the growth one of Russel's bodies. The case is unique because of the enormous mass of Russel's bodies.

The bodies develop from or in the plasma cells, and as the epithelioid cells arise from the plasma cells, these may also contain Russel's bodies. Russel's bodies are differentiated from all other products of hyalin degeneration because of their marked affinity for picric acid in staining by von Gieson's method. These bodies are colored dark brown with medullary sheath staining methods. They develop within a period of one hundred and fifty-three days. M. W. J.

Bony Tumors of the Orbit.

Cramer (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) noted a gush of ink-like material when removing the bony tumor, but the suddenness of the appearance of this material made it impossible to preserve any for examination. He believes that the tumor arose as follows: A cyst in the vicinity of the ethmoid cells, because of some form of irritation, became bone in part of its extent and then continued growing as such. The pressure of same on the neighboring walls of the orbit produced an inflammation of the periosteum, which led to the formation of exostoses and other changes in the orbit.

M. W. J.

Infiltration of Leucocytes in the Choroid in Leucemia.

Koyanagi (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) examined four eyes from patients who had myelogenous and two from patients with lymphatic leucemia. Three of the former showed no changes of importance excepting the hemorrhages. One of the cases of this type and two of lymphatic leucemia showed changes in the choroid. There was distention with leucocytes of chloridal vessels of the posterior layer in the myelogenous cases. The lymphatic case showed a similar accumulation of lymphocytes in the posterior choroidal layers, but here the lymphocytes without a doubt lay free in the stroma. Koyanagi believes that these cells proliferate in the perivascular spaces. Observation of this series of cases leads the writer to the belief that the pallor of the fundus may be due to a variety of causes, as asserted previously by Verderame.

M. W. J.

Abnormal Voluntary Ocular Movements.

Lechner (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) reports a case in which the patient can voluntarily cause his eyes to diverge and then fix on a point without any change in the accommodation. This is the second of such cases reported by him. M. W. J.

The Combination of Organic and Functional Diseases.

WISSMANN (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) reports a case in a married woman of twenty-eight years, in which the combination was such that subordination of one to the other was hardly possible. The history was as follows: Onset in left eye, with marked loss of vision, with headache and pain on moving eyes, followed by blindness in a few days. Left pupil fixed with retention of consensual reaction from other eye. Otherwise negative findings. After three weeks, slow return of light perception with reappearance of pupillary reaction. Slight blurring of temporal disc border and later slight pallor, central scotoma for colors and concentric contraction of visual fields.

On the right, complaint regarding diminution of vision; objectively no findings; concentric contraction of visual fields. At the end of fourteen weeks prompt pupillary reaction on both sides. Vision equaled 6/18. With symptoms of depression, contraction of from ten to fifteen degrees in the visual field with complete loss of colors.

Neurologically left facial paresis, loss of reflexes of abdominal wall, positive Babinski, loss of Achilles tendon reflex on the left. Achilles and patellar clonus as well as a great variety of sensory disturbances.

The pictures of multiple sclerosis and hysteria are definitely shown, and between them the eye symptoms. The changes in the opticus must be attributed to the multiple sclerosis, while the changes in the fields must be laid at the door of the hysteria. M. W. J.

Psammoma in the Anterior Angle of the Chiasma.

HEINRICHSDORF (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) found the growth at autopsy in a female who had succumbed to general arteriosclerosis and contracted kidney. The mass developed from the dura mater. Clinically no visual disturbances were noted, possibly because the tumor was only of cherry size. M. W. J.

Vitiligo of the Lids and Poliosis After Blunt Injury.

Steindorff (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). The patient, a woman of twenty-five years, suffered a blow on the left brow when five years old. Shortly afterwards the skin and lashes, as well as some of the hair of the eyebrow, became gray and have remained so. He attributes the phenomenon to trophoneurotic disturbances set up by the injury.

M. W. J.

Copper Splinter Injuries of the Vitreous.

Speyr (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). Splinter of copper in vitreous followed explosion of a copper shell. Extraction by means of incision through sclera. Traumatic cataract, followed by needling and good vision with correction.

M. W. J.

The Cord Perimeter.

Holth (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914) has designed a very cheap serviceable perimeter which can be carried in the pocket. He describes the instrument in detail, and the description is supplemented by illustrations. Its value lies in the possibility of inducing general practitioners to take fields during their visits or at their offices. He thinks that many cases of chronic glaucoma complicated by opacities in the lens and which are, therefore, diagnosticated as beginning cataract, may thus be detected by the general man.

M. W. J.

Instrument for Measurement of Distance of Lenses From Cornea.

Sattler (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). After discussing instruments of Priestley and Smith and Wessely, which can be used for this purpose, he describes his own.

A bar of wood twenty-five centimeters long, having a plus six lens fixed 16 2/3 centimeters from one end and a twenty millimeter scale at the other. The free end is placed on one's own lower lid, the other supported at the patient's temple by the hand of the examiner.

Sattler claims exactness for this instrument, which is inexpensive.

M. W. J.

Optometer for the Subjective Determining of Refraction.

Birkhauser (*Klin. Monatsbl. f. Augenheilk.*, July-August, 1914). Description of the instrument used at the Berne Eye Clinic. Illustrated. M. W. J.

Spontaneous Luxation of the Ectopic Lens Into the Anterior Chamber and Internal Rupture of the Sclera Without Trauma.

Handmann (*Klin. Monatsbl. f. Augenheilk.*, September, 1914). In one case the lenses were displaced downward, evidently a congenital condition. The lower zonula fibers were directed backwardly, which may have been a factor.

In both of these cases Handmann considers the nontraumatic origin of the scleral rupture as evidence for the support of Stolting's advice, that we must be cautious in estimating the direct and indirect effects of injuries of the eyeball. Rupture of inner layers of the sclera is frequently present; not due primarily to the injury, not even to be attributed to the slightest initial tear. By going into the history of the patient we will occasionally discover that a glaucoma coming on long after an injury, with which it is only distantly related, is the essential cause of the rupture of the inner layers of the sclera.

M. W. J.

Effect of Thorium on the Eye.

Abelsdorff (*Klin. Monatsbl. f. Augenheilk.*, September, 1914). The introduction of thorium X solution into the anterior chamber produces a depigmentation of the iris in rabbits. In larger doses a parenchymatous keratitis is set up. The latter may resolve, but can be complicated with ulcer formation and severe conjunctivitis. The ulcers heal with scar formation. In sufficient dose, the iris may become totally atrophic.

Anatomic examination shows that the changes cease at the ciliary body and that the posterior portion of the eyeball is not affected. In the iris, besides hemorrhages and changes in the vessel walls, degeneration of chromatophores and marked increase of pigmented cells.

Injections into the vitreous produced vascular changes in the retina, hemorrhages and exudate, with surrounding detachment. Because of progress anteriorly of the thorium X solution within a week, the iris showed depigmentation. The hemorrhages may be reabsorbed after a few weeks and the fundus show the picture of a choroiditis in form of white and black patches. After larger doses, markings of the eye grounds may be well-nigh obliterated. These changes in the posterior portion of the bulbus are attributable to the only slightly penetrating Alpha and Beta rays.

The chromatophores of the iris and the endothelium of the cornea are the most susceptible to the rays. Lens remains unaffected. Not only the anatomically shown pathology of the vessels, but the ophthalmoscopic examinations, show that the thorium X acts directly on the vessels. These experiments demonstrate the feasibility of using thorium X in the treatment of iris growths. M. W. J.

Acute Conjunctivitis and Trachoma in Infants in Egypt.

Meyerhof (*Klin. Monatsbl. f. Augenheilk.,* September, 1914) believes that gonorrheal infection of the eyes in Egypt is largely extragenital. The temperature and filthy living conditions are contributing factors. Corneal complications were seen in sixty per cent of his eye patients under one year. Koch-Weeks infections were present in sixty-three per cent of such patients. He speaks of the frequency of membranes resembling those of diphtheria in Koch-Weeks infections. Real diphtheria is rare. His earliest cases of trachoma were seen at four months, and he calculates that twenty-five per cent of Egyptian children get the disease in their first year. The principal source of infection is the older children of the family. The mother or nurse is apparently less often the starting point. He saw no trachoma following in the wake of inclusion blennorrhea, and his cases did not prove the identity of the two diseases. M. W. J.

Effect of Optochin on Conjunctivitis Blennorrhoica.

Puscariu (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) reports rapid cures with optochin in fresh cases and in those past the acute stage. In the acute cases a maximum of fourteen days was required. Corneal ulcers and infiltrates showed a marked susceptibility to this treatment. She believes her experience proves optochin superior to nitrate of silver in this disease. An additional advantage is the fact that it can be used freely by a layman.

In cases with profuse secretion and marked inflammatory reaction, hourly instillations with one per cent optochin solution, after previous cleansing of the eye. In this way ten to fourteen treatments are given in twenty-four hours. When the secreting ceases and the child opens its eyes, the optochin in two per cent strength is instilled every two hours. The lids are everted and the solution allowed to bathe the conjunctiva for one minute. M. W. J.

Experience With the Endonasal Opening of the Tear Sac by the West-Polyak Method.

ROCHAT AND BENJAMINS (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) report brilliant results in five of seven cases operated on. M. W. J.

Voluntary and Involuntary Eye Movements. (Nystagmus of the Blind, Proprioreflex, Involuntary Fixation of Animals.)

BARTHELS (*Klin. Monatsbl. f. Augenheilk.*, September, 1914). In rabbits, eye movements are instigated by the auditory apparatus, and these animals have no trace of involuntary fixation. Section of the acustici in rabbits produces a standstill in eye movements. In other mammals who have the power of voluntary fixation, the voluntary movements merely become less exact. Premature children show absence of rotatory nystagmus. Therefore, in humans, during the nursing period, before the development of fixation, although the auditory apparatus is already of influence, there is no spontaneous nystagmus, or at the most, irregular eye movements whose etiology is unknown.

(a) Nystagmus of the Blind.—Classified as: 1. Weak-sighted (amblyopes). 2. Totally blind (amaurotes).

These are subdidived into those who entered either class before or after development of fixation. In the second class is noted whether the lack of sight was of long or short duration. Those totally blind for a long time show nystagmoid twitching of a peculiar kind, which Bartels has named "Nystagmus of the Blind." The totally blind are not cognizant of the position of the eyes; they do not feel the spontaneous movements. Those totally blind for a long time can either not all or scarcely carry out movements on request. Psychic influence is clearly noticeable. These movements cease during sleep. A previous report by Barthels stated that the blind reacted less to aural stimulation than do normal individuals whose fixation had been cut off by means of convex lenses. He concluded at that time that the spontaneous nystagmus of the blind acts antagonistically against the nystagmus induced by the aural stimulation. From which may be concluded that the nystagmus of the blind does not at least proceed from the ear.

This nystagmus of the blind occurs also in persons who have never had a trace of light perception. Many recently blinded show no nystagmus, but all who have been totally blind for years have it. For the appearance of blind nystagmus the influence of higher paths or centers is necessary, and it is not necessary that the individual have had vision previously.

"This nystagmus is not due to fruitless efforts at fixation, but the inability to fix accurately permits certain central stimuli (reflexes) to come into view."

That the ear influences the eye muscles is no longer a doubtful matter. What influence the vestibular apparatus has on this nystagmus of the blind is still undecided.

(b) Proprioreflex.—Socalled proprioreflexes of Sherrington, which arise from stimuli in the body itself, are perhaps to be considered as factors in the production of blind nystagmus. We have a peripheral sensory cerebellar tonus, one coming from the labyrinth and one from the cerebrum. Bartels believes that these three proprioreflexes, following loss of fixation due to lack of sight, make in a measure a plaything of the bulbus.

(c) Voluntary Eye Movements of Animals.—1. Animals moving eyes voluntarily. 2. Animals moving eye entirely from auditory apparatus.

Previous examinations show that voluntary fixation is very irregularly found in the animal kingdom. M. W. J.

Retinitis Punctata Albescens et Pigmentosa.

Diem (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) considers this a patient in whom two ocular diseases are present side by side. M. W. J.

Acute Glaucomatous Attack Set Up by Instillation of Holocain Zinc Solution.

Gjessing (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) observed an acute glaucomatous attack in an amaurotic eye after instilling one drop of one per cent zinc solution following tonometry under holocain. M. W. J.

Orbital Phlegmon With Atrophy and Pigmentation of the Optic Nerve, Following Tear Sac Suppuration.

Rössler (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) reports a phlegmon of the orbit arising spontaneously after long standing suppuration of tear sac. Amaurosis followed in this eye shortly after the onset of the inflammation. It was accompanied by optic neuritis which left the papilla pigmented in the temporal portion. This phenomenon is generally accepted as the result of hemorrhage in the nerve itself or in the sheath. M. W. J.

Polycythemia and the Eye.

Ascher (*Klin. Monatsbl. f. Augenheilk.*, September, 1914). The ocular symptoms of this disease are hyperemia of conjunctiva of both eyes. Same is of a dark livid hue, as after long continued application of astringents. There are no evidences of inflammation, especially no secretion. The sclera is discolored blue. Asthenopia, which is due to engorgement of the ciliary muscle, is sometimes complained of. This engorgement leads to shortening of sagittal axis of eyeball with probable increase in hyperopia.

Fundus Polycythemicus.—Increase in caliber of retinal vessels and the appearance of numerous otherwise invisible ones attract immediate attention. The markedly dilated vessels emerging at the disc force apart the fiber bundles of the optic nerve and produce a picture resembling choked disc. Some writers have reported measuring as high as 3 D. of swelling, but Ascher has never noted any prominence. Uhthoff called attention to peculiar variations in the caliber of retinal vessels in this disease, due to loss in elasticity, to atony of vessel walls. The congested choroid produces a picture resembling cyanosis retinæ. The latter has frequently been found unilaterally, whereas the former is always binocular. Ascher thinks that the condition can be more early recognized from the eye symptoms and relief furnished before the more pronounced features of the disease appear. M. W. J.

The Pallidin Reaction in Keratitis Parenchymatosa.

Christel (*Klin. Monatsbl. f. Augenheilk.*, September, 1914). In fifteen cases of interstitial keratitis giving a positive Wassermann there were four markedly positive reactions with pallidin. In twelve other cases of eye disease in which lues came into question, the Wassermann was twice positive, the pallidin never. He conceded the reaction of no diagnostic value in this disease or advantage over the Wassermann test.

M. W. J.

A Case of Acute Quinin Poisoning With Persisting Contraction of Visual Fields of High Degree.

Speyr (*Klin. Monatsbl. f. Augenheilk.*, September, 1914). A woman of forty-one years became blind after taking two teaspoonsful of quinin in powder form. She had never before used the drug. The second teaspoonful was vomited forth immediately after taking. Within five minutes a state of delirium with loss of hearing and sight came on. Three months later hearing was normal, but the visual fields were so contracted that the patient was for all practical purposes blind.

M. W. J.

Methodic Examination of the Vascular Circulation in the Vicinity of the Corneal Border.

Streiff (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) used a Hartnak lens in preference to the corneal microscope, because only the more marked changes are seen with the former and differentiation between the physiologic and pathologic is therefore easier. Definite interruptions in the circulation of the conjunctival vessels point to pathologic slowing up of the blood stream. He calls attention to the frequency of caliber difference and aneurismal dilatations of conjunctival vessels as the earliest evidence of certain constitutional conditions. These and fine hemorrhages at the limbus speak for disturbances of circulation in the eye itself. Marked vascular changes at the limbus in patients with cataract are apparently of consequence, as in such patients fluidity of vitreous has been noted.

M. W. J.

Binocular Amaurosis With Luxation of Lens and Extraordinary Development of Intercalary Staphylomata With Increased Tension in Congenital Aniridia.

AUGSTEIN (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) reports this picture in a female of thirty-one years. The patient had been carefully examined when ten years of age, at which time binocular opacities of the cornea, nystagmus, aniridia and cataract centralis anterior were noted.

Progressive increase in size and prominence of eyes. Blindness due to glaucoma. Never any pain, but occasionally sensation of stretching and irritation. M. W. J.

A Primitive Telescope and Its Use for Persons With Very Low Vision.

REITSCH (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) recommends an instrument for this type of patient of small means. It consists of a —18 and plus 3 D. having a magnifying power of six. Patients of extremely low vision with a little practice are enabled to recognize people, read signs and notices. It can be carried in the patient's pocket, and is made by Nitsche and Gunther in Rathenow. M. W. J.

Technic of Tonometry.

LEVINSOHN (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) criticises the Schiötz tonometer on the following grounds: 1. Because held in the hand errors in reading will arise. 2. Pressure of instrument raises tension. 3. Changing of weights causes difference in pressure from cylindrical rod. Presents his modification of the instrument with illustration.

M. W. J.

Another Case of Late Infection After Elliot Operation.

Stower (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) reports a case of infection after operation. M. W. J.

Case of Accommodation Paresis Following Diphtheritic Vulvovaginitis.

Pape (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) concludes that the paralysis of accommodation which came in six weeks, following appearance of a vulvovaginal discharge in a girl of twelve years, was of diphtheritic origin. No bacteriologic examination or confirmatory diagnosis from general practitioner. M. W. J.

Reply to Rado's Work "Vital Staining of Endothelium of Descemet's Membrane."

Hamburger (*Klin. Monatsbl. f. Augenheilk.*, September, 1914) brings further proof to combat the negative findings of Rados, Schreiber and Schnaudigel, who tried his technic.

M. W. J.

ABSTRACTS FROM FRENCH OPHTHALMIC LITERATURE.

BY

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SAN FRANCISCO.

JESSE S. WYLER, M. D.,

CINCINNATI.

Prognosis and Treatment of Hydrophthalmus.

FAGE, A. (Le prognostic et le traitement de l'hydrophtalmie, *Arch. d'Ophtalmologie*, Vol. XXXIV, March-April, 1915, p 574). Some cases of hydrophthalmus come to a spontaneous stop, with the conservation of a fair amount of vision. Axenfeld has said that megalocornea is, in reality, an abortive hydrophthalmus, and that the tension may vary greatly in these cases. Thus, a child with normal vision, showed a tonometric pressure of forty-five millimeters, which would mean glaucoma in an adult. The tension, therefore, is no sure guide in these cases. Carlotti presented a patient twenty-six years old, with hereditary hydrophthalmus, who had normal tension and vision of 0.7. The author had a case in a subject twenty years old, which had come to a standstill without being treated, in whom there was normal tension, absence of excavation of the papilla, and who could read with appropriate correction.

These cases, however, are rare. As a rule the hydrophthalmus progresses to total blindness, and the distention of the globe gives rise to irritative conditions producing retinal detachment and vitreous hemorrhages. Myotics are useful, but in most cases insufficient. As soon as it was recognized that hydrophthalmus was in reality infantile glaucoma, all the surgical measures used in glaucoma in adults were tried. No single surgical measure could be adapted to all cases, inasmuch as the etiology differs. Stimmel and Rotter, for instance, obtained an excellent result in one case in which the excretory apparatus was normal, the case being one of vasomotor hypersecretion; in two other cases they had absolute failure with the same operation, and it was found that in these cases the canal of Schlemm was absent, the iris and ciliary body rudimentary, and the ciliary muscle in a fetal state of development.

The important points brought out are that all operative interference should be undertaken early, and they should be very small in extent. Stoelting calls for repeated sclerotomies in chloroform anesthesia; Gutman believes in iridectomy done with a lance knife, the incision lying in the cornea, and not in the sclera; Dufour fears operative procedures, and thinks that the use of myotics will keep the pressure down until the child is four years old, when the natural tendency to self cure asserts itself. The reports from Haab's clinic show that the majority of the cases treated with repeated sclerotomy did well; some of the patients were only a few months old. In Sattler's clinic iridectomy was done in forty-one cases, in which twenty-three were not benefited, seven were made worse, eleven were improved, seven being really cured. Puncture of the anterior chamber gave lasting improvement in three cases.

Heine uses his cyclodialysis in hydrophthalmus, and Axenfeld considers this the ideal operation when combined with sclerotomy. Wicherkiewicz recommends crucial posterior superficial sclerotomy, but Fage fears this operation would give rise to staphyloma if practiced on the very thin coats of the globe.

Perforating sclerectomy, tried by Lagrange in three cases, gave good results in two cases; in the third there was loss of vitreous and eventually atrophy of the globe. Sympathectomy having been abandoned in adult glaucoma, has also been dropped from the surgical procedures in hydrophthalmus, although warmly advocated at one time. The author reports on a series of thirty cases. Some of these were lost from observation or had myotics only. Fourteen were treated by repeated sclerotomies (reduced sclerotomy—i. e., puncture and counterpuncture), leaving a bridge of tissue and thus avoiding the dangers of intraocular hemorrhage and staphyloma. He thinks iridectomy should rarely be done in this condition, as the thinned coats resent this measure, and every greater manipulation exposes the eye to the loss of vitreous, luxation of the lens, and intraocular hemorrhage. The Elliot operation seems

to the author to be the ideal operation in hydrophthalmus, inasmuch as the oft resulting cystoid scar gives the eye the best means of keeping down the intraocular tension. Whatever is done should be done early. Five of the cases operated by the author regained normal tension and the globe ceased enlarging.
M. W. F.

Permanent Disabilities of Ocular Origin Received in Military Service and Their Indemnification.

Coutela, Ch., Paris (Des incapacités permanentes d'origine oculaire et de leur indemnification au point de vue militaire, *Arch. d'Ophtalm.*, Vol. XXXV, January-February, 1916, p. 17). In 1831 Louis Philippe promulgated the law which is the basis of the present day scale of indemnity for war wounds, and which leads to many injustices, when compared with the indemnities accorded by civil law. Blindness must be absolute to be classed as such, and must be irremediable and permanent. In such cases the incapacity is rated at one hundred per cent; but Coutela thinks France should follow the example of a number of foreign countries and rate the damage at one hundred and twenty-five per cent, as the blind man is not alone unable to earn his own livelihood, but is a source of expense to his surroundings. (The United States pays one hundred dollars a month for the loss of both eyes. For the loss of sight of one eye they pay twelve dollars, and for the loss of one eye seventeen dollars, although it does not appear quite plain why such a difference in ratings should be made.) Coutella thinks the definition of blindness should be made wide enough to include all those whose loss of vision prevents them from carrying on their vocations, that is, from 1/10 to 0.

Coutella says that the law needs modernizing, dating as it does back to 1831, twenty years before the invention of the ophthalmoscope, and containing many absurdities leading to injustice to those who have bravely exposed life and limb for the protection of their country.
M. W. F.

Breaking Down the Nasal Canal for the Cure of Dacryocystitis.

Aubineau, E. (L'effondrement du canal nasal dans la cure de la dacryocystite, *Arch. d'Ophtalm.*, Vol. XXXV, January-February, 1916, p. 33), contrary to the watchword formulated by Beard in his Ophthalmic Surgery, "always the conservation of the lacrimal canal whenever possible," advises the breaking down of the nasal duct, and says that during an experience of ten years he has been able to send the patients away cured after a fortnight's stay in the hospital. Under general anesthesia an incision one centimeter long, and placed so that the upper third lies above the internal palpebral ligament is made; the cut is carried at once to the bottom of the lacrimal sac. With a small curette the sac and adjoining tissues are scraped away, and, after passing a large Bowman catheter the nasal canal is smoothed with a curette of Chatellier. The curette must be held with the cutting edge directed forward and the instrument inclined in the same direction as the catheter until it enters the nasal fossa. A piece of gauze tape is passed, and a light pressure bandage applied for forty-eight hours. After a week the bandage can be omitted, and the patient sent home after a fortnight. The scar left by the operation is very slight.

M. W. F.

A Traumatic Syndrome of the Anterior Segment of the Eye.

Frenkel, Henri, Chief of the Ophthalmic Center of the Nineteenth Region (Sur un syndrome traumatique du segment anterieur de l'oeil, *Ann. d'Oculistique,* Vol. CLIII, June, 1916, p. 233). Amongst the nonperforating traumatisms the chorioretinitis due to contusion and contre-coup is well known. The author calls attention to another syndrome affecting the anterior segment of the eye without lesion of the deeper structures of the globe, a condition generally seen in soldiers wearing helmets. The injuries are generally due to shell or grenade fragments. Various injuries of the soft parts are noted, but no bone lesions, as in the cases presenting changes in the retina and choroid. The changes presented in this syndrome are:

1. The cornea and sclera are intact, proving the absence of perforation;
2. At some part of the iris a small perforation or a minute iridodialysis;
3. Subluxation of the lens in a direction indicated by the iris perforation. Iridodonesis, racket-shaped pupil, the small end being directed towards the iris perforation.

4. Subcapsular opacity, nonprogressive, but causing marked loss of vision.

5. Normal fundus; in some cases, however, where the lesions are not limited to the soft parts of the face, fundus lesions may also be present.

6. Vision equals 1/20 to 1/50 or less.

The last shows that the lesions of the anterior segment are much more prejudicial to the function than those of the posterior segment; in the latter the vision may be equal to 20/20 in spite of marked atrophic and pigmentary lesions in the periphery of the retina. M. W. F.

How to Determine the Presence of Powdered Ipecac in the Conjunctival Sac.

KALT, M. (Sur la recherche de la poudre d'ipéca dans l'oeil, *Ann. d'Oculistique,* Vol. CLIII, June, 1916, p. 245). Amongst the many things used by soldiers to produce an artificial conjunctivitis, and thus shirk duty, powdered ipecac is one of those frequently resorted to. Kalt gives a method for gathering even minute quantities remaining in the conjunctival sac with a pellet of guncotton, which is afterwards dissolved in ether and alcohol, and the ipecac particles caught in the collodion, to be subjected to microscopic examination.

M. W. F.

Keratoconjunctivitis and Nasal Lesion.

MAGITOT, A. (Kerato-conjunctivites avec lésions nasales, *Ann. d'Oculistique,* Vol. CLIII, June, 1916, p. 247). The army surgeon is by force of circumstances constantly on the lookout for malingerers. Malingering and simulation is much rarer at the front than in the interior. Nevertheless, many cases of simulated conjunctivitis, generally of the right eye, are met with. Pepper, powdered ipecac, street dust, etc., are used to simulate the conjunctivitis, and in two cases inoculation with gonorrheal virus even was resorted to.

In one hundred cases of real kerotaconjunctivitis, which were genuine, nasal lesions were found in ninety-five cases. In thirty acute rhinitis presented, twenty-five had deviations of the nasal septum, five ozena, seven luetic lesions and thirteen maxillary or frontal sinuitis.

The view that these cases of keratoconjunctivitis are due to an infection ascending from the nose through Hasner's valve was not borne out by the somewhat meager bacteriologic researches possible under the conditions prevailing at the front. The conjunctival secretions were mostly negative, and the flora of the nasal secretions very scanty, a coccobacillus staining with Gram prevailing.

This finding agrees with those of previous investigators. An infection, moreover, is not necessary to explain this syndrome. We have but to think of the intimate relation between the nerve supplying the anterior part of the eye and the nasal chambers to appreciate the fact that an irritation of the common nerve centers may give rise to the syndrome. If to the thoroughly deadened mucosa of the lower meatus we make an application of a two per cent solution of silver nitrate we get a pericorneal and bulbar conjunctiva hyperemia, even though there is no sense of burning in the nose. We must also bear in mind the many other proved connections between nose and eye conditions.

The therapeutic proof is given by the retrogression of the eye symptoms by merely relieving the nose conditions.

M. W. F.

Some Ophthalmologic Lessons of the War.

JESSOP, WALTER H. (Quelques leçons ophtalmologiques de la guerre. *Arch. d'Ophtalmologie,* Vol. XXXV, July-August, 1916, p. 193, presidential address read before the Congress of the Ophthalmological Society of the United Kingdom on May 4, 1916). Whereas in the American Civil War there were forty-one cases of sympathetic ophthalmia in two hundred and fifty-four cases of destruction of the globe, and in the Franco-German war in 55.6 per cent of all the cases of wounds to the eyeball, the present war has not produced a single case of sympathetic ophthalmia, in spite of the large number of eye injuries, especially of those due to shrapnell. The author thinks this is due to improved diagnosis and the practice of removing early all of the parts of the severely injured eyes.

Injury of the vault of the skull by bullets has been more frequent in this war than in any preceding war, and in about sixty per cent of such injuries papillary edema has been observed.

The author thinks that this will lead to a revision of the chapters on optic neuritis, papillary stasis, and neuroretinitis. With this papillary edema there was present an increased intracranial pressure; when this latter disappeared the papillary edema rapidly subsided, and all other fundus changes, such as hemorrhages, etc., disappeared. This seems to prove the theories of Paton and Holmes, that the prominence of the papilla in cerebral tumors is a pressure, and not an inflammatory symptom.

A large number of the soldiers in the trenches were attacked by nephritis, the real cause for which has, so far, not been discovered. These cases of nephritis are of the acute type, and are due to an infection resembling the infection in scarlet fever, from which, however, they differ. The first symptoms are dyspnea, sore throat, and edema; the latter presents itself generally in the face and extremities first. The blood pressure is raised. The urine shows albumin, from a cloud to an almost solid coagulum. Vomiting, attacks of uremia, and headaches are often present. The prognosis, however, is good. Jessop examined the eyes in one hundred and fifty soldiers suffering with trench nephritis. In a number of them edema of the retina was present, but this often disappeared in a few days; a few cases showed flammiform hemorrhages, beginning retinitis, and the typical albuminuric retinitis. In the last mentioned all signs of the fundus change had disappeared in sixteen weeks.

The author makes an interesting comparison of these cases of infectious trench nephritis with the toxic retinitis in pregnancy, in tuberculosis, in diabetes, syphilis, intracranial tumors, etc. He fully agrees with the author of the article in the *Encyclopédie d'Ophtalmologie,* when he says: "The chapter on albuminuric retinitis is more vague and less convincing than ever."

M. W. F.

Bilateral Blindness Due to Concussion of the Brain Cured by a Simulated Operation.

Lagrange (Un cas de cécité bilaterale par ébranlement cérébral, ayant dure quinze mois, guérie par un simulacre d'opération. *Arch. d'Ophtalmologie,* Vol. XXXV, July-

August, 1916, p. 210). An infantry soldier was lying in a dugout when a bomb exploded near him. For half an hour he was unconscious; when he came to his comrade asked him whether he was hurt. He answered that nothing hurt him, but that he was blind in both eyes. After passing through several hospitals he went back to his farm. He had been examined by three competent oculists, who each certified to his blindness, all of whom made the diagnosis of hysterotraumatic blindness. For over a year he suffered with headaches and twitching of the eyes, but there were no signs of local inflammation in the eyes. He learned the Braille system, and passed his time playing cards with other blind and seeing invalids. All those who examined him assured him that he would regain his sight, with which he professed himself well satisfied, preferring that to the military medal given to those who had been severely wounded. In his own home and in the hospitals he conducted himself like a totally blind person. All parts of the eyes appeared perfectly normal, the pupils were of average width and reacted well to all stimuli. Nevertheless, he made no defensive movement when a pen was suddenly thrust at his face, or a flame flashed in his eyes.

In spite of this, Lagrange was satisfied that the man was a malingerer. His face was always fixed; he complained that he could not move his eyeballs except to a limited extent; he never looked at the person speaking to him; even in a room with which he should have been familiar he always felt his way about, and in doing this used the backs of his hands and fingers instead of the palms of his hands and pulps of his fingers. Fifteen months after the accident Lagrange announced to him very solemnly that the only way to restore his vision was by a severe operation, which consisted in attaching the optic nerves to the brain with silver wires. He was told that if he refused to undergo this operation he would have to sign a document to that effect. He was chloroformed very carefully, and while he was partially under the influence of the anesthetic, questions were asked of him, and a thermocautery held close to his eyes, without his betraying that he could see. When he was completely anesthetized an irritating solution was applied to his conjunctival sacs, and a binocular bandage applied. When he awoke he was told that the operation had been perfectly successful, and that, although he might already perceive the light, it would be at least a fortnight before he could really see a little. The orderly was instructed to impress on him that even though he would be able to see a little at a distance, that that would not be a reason for returning him to active duty, as the sight required for active duty was far greater than the amount which he would have. This seemed to quiet the great fear that he had of being returned to the front. Four days later the bandage was removed, the lids carefully separated and washed; he saw light at once, and after a while distinguished hand movements at half a meter. Two days later he saw the features of the nurse's face, and after another two days he could read coarse print, and his vision rose to 1/4. It was constantly impressed on his mind that he would be able to see closeby only. After ten days more he seemed to give up the fight, and volunteered that his eyes had become mobile again, and that his vision for distance had returned. This was after he had been given a blue colored solution to bathe his eyes with, and some methylenblue pills, with the assurance that they would cause a return of the vision for distance. His sight rose to 7/10, field for color and form normal. He was then in shape to be returned to the front.

The question was: Was this a malingerer of exceptional energy, or was this a case of monosymptomatic hysteric blindness? M. W. F.

Palpebral Gigantism.

POULARD AND DANTRELLE (Hypertrophie chronique du centre de la face et des extremités des membres; gigantisme palpebral. *Société d'Ophtalmologie de Paris*, April, 1914). In addition to other symptoms of Marie's disease the patient, a man of thirty-nine years, showed such a marked hypertrophy of the lids that the field of vision was much reduced. A crescentic piece, including all the tissues, was excised from both upper lids. Microscopic examination showed a hypertrophy of the sebaceous glands, a hyperplasia of the skin, and a marked hypertrophy of the Meibomian glands in a much thickened tarsus. Besides, there was hypertrophy of the frontal sinuses and of the orbital walls. The result was good both cosmetically and functionally. M. W. F.

Paramacular Scotoma With Loss of Vision Following a Wound of the Occipital Region.

Frenkel, Henri (Sur un cas de scotome paramaculaire avec abaissement de l'acuité visuelle par blessure de la région occipitale. *Arch. d'Ophtalmologie,* Vol. XXXV, July-August, 1916, p. 218). Besides the different forms of hemianopsia of cerebral origin there occur cases of persistent amblyopia which justify the distinction between the cortical localization of the macula, and the cortical localization of the periphery of the retina.

A soldier, aged twenty-two years, was struck in the occipital region by a shell fragment. Taken prisoner he was trephined two months later in Germany, and later exchanged back into France. Unconscious for six hours, he was totally blind for seven or eight days. After the trephining his general health improved, but his sight remained stationary.

When asked to read the patient tilted his head forward, and inclined it to the left when reading with the right eye, to the right when reading with the left eye. At five meters his vision was equal to 0/1 with either eye; at two and one-half meters it was equal to 0/2. He read 0/7 Wecker with either eye. Binocular vision does not raise the vision, nor does correcting lenses improve it. There was a scotoma down and out in the right, and down and in in the left eye. In each eye the scotoma concerned about one-half of the macular region. The field for form was normal in peripheral extent in both eyes. The changes were thought to be permanent, inasmuch as they had already been in existence for over fifteen months.

M. W. F.

Hypophyseal Optic Atrophies and the X-ray.

Darier (Atrophies optiques, hypophyse et Rayons X. *La Clinique d'Ophtal.,* March, 1916), upon finding an optic atrophy, attempts by every means to determine the cause so as to ward off the terrible end results by proper therapy. Certain atrophies due to retrobulbar lesions are stopped and improved by the author's method of subconjunctival injections. Perimetric findings furnish us with one of the best diagnostic methods, revealing central scotomata and thus making a favorable prognosis. Bitemporal hemianopsia means a hypophyseal tumor, and as these are usually sarcomata or adenomata, they respond to X-ray therapy (which fact the reviewer doubts).

Histories of two cases of tumor of the sella are briefly given: The first patient was treated in 1904, and died five years later with only 1/40 vision. This observation is not conclusive. The second case had acromegaly and the radiogram revealed the tumor. After two years' treatment the vision was much improved, as was also his genital impotence. At present there is a third case under observation.

In all cases, before treating, a Wassermann should be made upon the cerebrospinal fluid, as the lesion may be gumma at the base. Surgical action is most difficult and fatal, therefore, in 1909 Gramegna advocated Roentgen rays. As nerve tissue is most resistant to this therapy, a prolonged action is necessary in this locality.

Technic.—The rays are localized in a three centimeters space, best over the thin shell of the temporal bone. A one millimeter filter of aluminum allows only bone penetrating rays to pass. Only 3 H. strength is used on each irradiated point. Exposures are made weekly for several months.

The favorable results are explained by the susceptibility of glandular cells and neoplastic tissue to the destructive action of the X-ray. In ophthalmic cases the only hope is before atrophy is far advanced, and in gigantism and acromegaly the growth can be stopped but not reduced. The entire article is lucid and positive, but not convincing. J. S. W.

Ocular Tuberculosis Secondary to an Occupation Accident. A Clinical and Anatomic Study.

Jocqs and Duclos (Tuberculose oculaire secondaire à un accident de travail. Etude clinique et anatomique. *La Clinique d'Ophtal.*, March, 1916) describe the interesting case of a boy of fifteen struck by a piece of iron in the center of the cornea. When first seen he had a small grayish ulcer which was cauterized with iodin. This healed, but pericorneal congestion with photophobia persisted. No pain nor decrease in vision. About twenty days later a few infiltrations in the parenchyma of the cornea, increasing to a marked haziness, tubercles on the iris, irresponsive pupil, increased tension, finally staphyloma, but no complaint of pain or tenderness. Tuberculin treatment was refused and finally it was necessary to resort to enucleation.

A complete histologic examination with microphotographs follows, showing a typical tuberculosis of the anterior segment of the eye. No bacteria were isolated in the tissuess.

J. S. W.

The Etiology of the Spontaneous Absorption of Cataracts.

VERREY (Contribution à l'étiologie de la résorption spontanée de la cataracte. *La Clinque d'Ophtal.*, April, 1916) describes another case of spontaneous absorption of a cataract and draws conclusions from the findings of others. Spontaneous absorption of a cataract is always a slow procedure and is preceded in the great percentage of cases by inflammatory phenomena, iritis, etc. The intraocular infection penetrates the lenticular capsule, starting a "phakitis," with frequent variations in the intraocular tension, then liquefaction of the lens fibers with more or less absorption of these and in fortunate cases rupture of the capsule, leaving a black pupil and vision never exceeding 1/6. Nature will not assist the patient beyond this acuity, and the author asks for practical proof of his theoretic conclusions. J. S. W.

Cataract and Aphakia From a Military Viewpoint.

AUBINEAU (Cataracte et aphakie au point de vue militaire. *La Clinique d'Ophtal.*, April, 1916) shows that the military regulations make no requirements of binocular vision, and if the visual acuity of one eye is 1/2, the other with 1/20 is satisfactory. Thus an unoperated cataract excludes a man from regular army service, only permitting duty in auxiliary branches, while an operated cataract (with success) does not exclude. If an eye is operable, extraction should be done for military reasons. Although the successful performance of an extraction does not relieve the State of its responsibility for a permanent incapacity, still it tends to lessen the prejudice caused by the injury. J. S. W.

Treatment of Tetanus Secondary to Orbitoocular Injuries.

GOETZ (Traitement du tetanos secondaire aux traumatismes orbito-oculaires. *La Clinique d'Ophtal.*, April, 1916) draws the following conclusions after a careful review of the entire subject of the treatment of tetanus:

1. Tetanus due to orbitoocular injuries is comparatively rare. However, five cases are recorded.

2. The point of entry in order of frequence is the globe, orbit, eyebrow, upper lid, lower lid and conjunctiva.

3. Infection is always due to contamination of a wound with earth or manure, and never to operative infections.

4. The symptoms of this form of tetanus are trismus, facial paralyses, and paralysis and contractures of ocular muscles.

5. The prognosis of the cephalic form is worse than any other.

Prophylactic measures consisting of enucleation, cleansing and opening of the wound and antitetanic serum injected early are the best measures.

7. In developed cases the best results are obtained by intravenous and subarachnoid injections of large quantities of the serum.

J. S. W.

Exophthalmic Goiters.

Debove (Les goitres exophtalmiques. *La Clinique d'Ophtal.*, April, 1916) describes old and new ideas in a clinical lecture. The etiologic factors are many, amongst which is found the neuropathic goiter following emotional shock and traumatic psychoses, and several observations are quoted. Then there is the traumatic type found especially in males. Two months after a blow on the head a soldier developed typical symptoms. The essayist had three such cases. There is also the simple thyroid swelling which ultimately turns into the exophthalmic variety. The disease is also associated with cardiac lesions, especially aortic insufficiency, also with accessory nasal sinus affections. A persistent thymus is revealed in many of the operated cases. The symptoms briefly consist of a mucous colitis, tachycardia, paralyses and neuralgias, albuminuria or glycosuria, and a false functionating of all the glands in the body.

The prognosis is as variable as is the etiology.

The treatment of this syndrome of Basedow is endless. The neurologists prescribe rest cures with psychotherapy and hydrotherapy. There is no result from a resection of the cervical sympathetic ganglia. A total excision of the gland produces myxedema. Debove has never seen a cure following the removal of the hypertrophied lobules of the thyroid, only improvement. The blood transfusions from thyroidized subjects has proven valueless.

Finally, the Roentgen ray and radium have acted beneficially in some cases, but as the latest theory is that the overactivity of the thyroid gland is due to stimulation from a persistent thymus, he directed the therapy toward the cause and made his rays act upon the thymus, obtaining, however, negative results. All treatment must vary according to the predisposing cause.

J. S. W.

ABSTRACTS FROM SPANISH OPHTHALMIC LITERATURE.

BY

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DENVER.

New Procedure for Antiglaucomatous Iridosclerectomy.

CASTILLO Y RUIZ, RODOLFO DEL, Cadiz (*España Oftalmologica,* April, 1916). The procedure described is a cross between the operations of Lagrange and Elliot. After cutting the flap of conjunctiva and dissecting down to the limbus, an incision is made through the sclera into the anterior chamber with a narrow lance knife, and a free iridectomy is done in the usual manner. The lower lip of the scleral wound is raised with forceps, and a disc of sclera is removed with a pair of punch scissors, which are illustrated in the article. The same maneuver is performed in the upper lip of the wound.

Subretinal Cysticercus.

BALBUENA, FERNANDEZ, Gijon (*España Oftalmologica.* April, 1916). The parasite developed in the macular region. being seen as a bluish-white sac by artificial light, with translucent walls, traversed by the retinal vessels. Near to the center was seen a clear rounded spot whose outlines were gradually lost in the rest of the cyst, and gave the sensation of something placed within or behind the sac. The history pointing to the presence of tapeworm, a tenifuge was given, with resulting expulsion of a worm. Immediate surgical intervention being refused, a subconjunctival injection of pelletierin was resorted to (one cubic centimeter of a one to five hundred solution). The following day the cyst showed a white spot in which there were oscillatory movements. Every few seconds this spot became more detailed, and the observer was able to see clearly the scolex with its four hooks. The vitreous became more cloudy, but the patient shortly disappeared. He returned eight months later, when the eye was enucleated after an unsuccessful attempt to extract the cysticercus through a scleral opening. The enucleated eye was demonstrated to contain the encysted cysticercus.

Congenital Cryptophthalmia and Anophthalmia.

SANTOS FERNANDEZ, J., Havana (*España Oftalmologica*, Vol, 1, No. 5, p. 4). These are the only two cases of the kind seen by the author in an experience of fifty thousand cases of eye diseases over the course of twenty-five years. The first patient was a three-year-old child. The mother had had five sons, each of which was born at full term, and no abortion. The ears were deformed, the nose unduly large. There were six fingers on the right hand, the supernumerary one being joined to the little finger; and the thumb of the same hand was not opposed to the fingers. The right foot also had an additional member. There was no palpebral fissure, the edges of the two eyelids on each side appearing to be adherent. The eyelids were depressed in such a way as to suggest that there was no eyeball behind them, and the sense of touch of the examiner failed to reveal the presence of even a rudimentary eyeball. The child died after twelve days.

The second patient was seen two hours after birth. The palpebral fissure was absent on the left side, and through the skin could be felt something which gave the sensation of an eyeball of very small dimensions. On the right side the lids and a conjunctival sac could be made out, but it was impossible to discover by simple inspection or by the sense of touch any evidence of the presence of an eyeball of whatever volume. This child also died in a few days. In neither case was there any blood relationship between the parents.

Congenital Fissural Dysmorphias of the Ocular Fundus

MENACHO, M. (*Archivos de Oftalmologia*, April, 1916). This title is given by the author to those anomalies produced by disturbance of the normal process of occlusion of the fetal ocular cleft. He includes in this classification both the colobomatas commonly so called and those anomalies which are characterized by substitution of tissues.

ABSTRACTS FROM SCANDINAVIAN OPHTHALMIC LITERATURE.

BY

William H. Crisp, M. D., Oph. D. (Colo.),

Denver.

Sclerectomy in Glaucoma.

Ploman, K. G. (*Svenska Läkaresällskapets Handlingar,* Vol. 42, p. 1). An opinion as to the permanency of results cannot be given earlier than one year after operation, says Ploman. This article, which covers three hundred pages, reviews a clinical material as follows: (a) Sclerectomy according to Holth: sixty-eight cases of primary glaucoma in fifty-five patients and one case of hydrophthalmus; three cases of absolute glaucoma and one case of hydrophthalmus led to enucleation and the rest were observed from one to five years after operation, the average being three years. (b) Trephining: fifteen cases of primary glaucoma in eleven patients and one case of hydrophthalmus; two cases of simple glaucoma and one of absolute glaucoma led to enucleation; the remainder were observed for from one to two and one-half years. From the point of view of complications, the study further included twenty-one cases operated upon according to Holth and forty-six according to Elliot; these cases were in the main only observed for a short time after operation.

Holth's Sclerectomy.—In forty-one cases out of sixty-three (excluding absolute glaucoma), the tension was regulated. Of four cases of acute glaucoma three were successful, including one in which iridectomy had previously been without effect. Of four cases of chronic inflammatory glaucoma two were successful, two sclerectomies being done in each case. Out of sixty-five cases of glaucoma simplex, thirty-six were successful, two operations being performed in each of the three cases. Of the complete series of cases mentioned in this paragraph, in five of the successful and two of the unsuccessful, iridectomy had previously been done without success.

In five cases of absolute glaucoma one good result was obtained, in one there was renewed rise of tension, and in three renewed rise of tension and pain, with consequent enucleation. In the case of hydrophthalmus two sclerectomies were without result; after the second operation a staphylomatous scar led to enucleation.

Regulation of tension was usually obtained immediately after operation, but in one case not until after five months.

The following figures show the value of iridectomy with sclerectomy. A renewed rise of tension developed after sclerectomy with peripheral iridectomy in seven cases, or thirty-three and one-third per cent; after simple sclerectomy in seventeen cases, or fifty per cent; after sclerectomy following previous iridectomy, in two cases, or 28.6 per cent.

Regulation of the tension was usually followed by preservation or improvement of function, but exceptions to this rule were encountered. Although twelve cases showed a tension of less than fifteen millimeters, in no instance could an injurious influence be attributed to subnormal tension.

Complications.—In ninety-six operations executed on eighty-nine cases of primary glaucoma and one case of hydrophthalmus, fenestration (?) occurred twice, iridodialysis four times, loss of vitreous three times, traumatic cataract once; the anterior chamber was usually restored on the second day, but in some cases only on the fourth to the tenth day. Serous choroidal detachment was observed twice. Postoperative iritis occurred in 26.7 per cent of the cases, in 11.6 per cent developing promptly after the operation, and in 15.1 per cent later. There was no case of late infection. Nine cases of secondary prolapse of the iris were observed (after simple sclerectomy).

The author divides the scars into three groups: flat scars, scars with conjunctival cushion, and ectatic scars, these last including uveal prolapse as well as ectatic hypertrophic connective tissue scars. The condition of the scars after sixty-nine operations is stated: a conjunctival cushion formed in thirty-six; an increase of tension developed after two of these operations; flat scars twenty-eight; a rise of tension developed after nineteen of these; ectatic scars were seen in five cases, in all of which a rise of tension subsequently developed. Iridectomy facilitates development of the conjunctival cushion.

In six cases the cushion disappeared, the increase of tension recurring; in two of these the cushion later reappeared, and the tension in these cases was thereafter constantly low.

Microscopic examination was done on three cases of absolute glaucoma, one case of hydrophthalmus, and one case of secondary glaucoma. In these cases the healing seems to have originated from the subconjunctiva or episclera, not from the sclera or uvea. In two cases the uvea blocked the operative wound, in three operations the ciliary body was wounded by the lance, after one operation an ectatic hypertrophic connective tissue scar had developed, and in one case the lens was injured.

Elliot's Operation.—Only thirteen cases could be completely followed longer than one year. To these may be added three which led to enucleation. The sixteen cases included two of acute glaucoma, twelve of simple glaucoma, one of absolute glaucoma, and one of hydrophthalmus. In eleven cases the result was good; in one case of glaucoma simplex rise of tension led to a second trephining; two eyes were enucleated because of rise of tension and pain, and enucleation was done in a case of absolute glaucoma for the same reasons. In the case of hydrophthalmus a large scleral staphyloma developed. On cases of primary, not absolute, glaucoma, fifteen trephinings were done successfully in eleven cases. Comparison of these with the figures as given by other writers shows that in cases of primary, not absolute, glaucoma, trephining is followed by a lowering of tension in from seventy to ninety per cent of the cases.

Trephining should be combined with iridectomy; which, according to the experience gained so far, is to be done preferably in the form of a peripheral iridectomy rather than a complete, since the former has equal value and is technically easier.

As regards complications, the seventeen operations already mentioned were available, and in part a further forty-seven operations on forty-six eyes (one acute glaucoma, four chronic inflammatory glaucoma, thirty-nine simple glaucoma). Twice a trephined disc fell into the anterior chamber, without anything further being noticed of it. In one case of absolute glaucoma it was impossible to replace the iris after complete iridectomy; the tension was thirty millimeters one month later.

Reestablishment of the anterior chamber followed in twenty-eight cases on the second day, in twenty-four cases on the fourth to the sixteenth day. No disadvantage seemed to follow delayed reestablishment, with the exception of one case of iridocyclitis and rise of tension with reestablishment on the ninth day (later enucleation), and of one case of iritis with seclusio pupillæ with reestablishment on the fourteenth day (later tension 13).

Serous choroidal detachment was seen in nine cases, in all of which peripheral iridectomy had been performed. Secondary iris prolapse was seen in four cases, two after simple sclerectomy, one after peripheral iridectomy, one after radial incision into the root of the iris; in one of these cases the tension rose, but fell after cutting off the prolapse. Mild postoperative iritis developed in sixteen cases, and more severe iritis with seclusio pupillæ in two cases, one of which recovered, while in the other the eye was enucleated.

The author collected the hitherto published cases of socalled late infection, to the total number of sixty; six after Holth's operation, nine after Lagrange's, and the remainder after Elliot's operation. The conjunctival cushion appears to be particularly vulnerable to late infection: in twenty-three out of the twenty-seven cases in which the appearance of the scar is described, there was a cushion. The result of this complication was noted in forty-six cases. In fifteen it was good, in ten there developed lowered visual acuity or rise of tension, and in not less than twenty-one the patient lost either the sight or the eye. As regards this complication, no particular procedure seems to have any preventive value.

Two cases were examined microscopically after the Elliot operation. In one of them, a case of glaucoma simplex, enucleation was done on account of rise of tension and iridocyclitis rather more than one month after the operation. The trephine hole was correctly placed, but the ciliary body had been injured at operation. In the second case, one of secondary absolute glaucoma, enucleation was done on account of rise of tension and pain. There was a markedly bulging scar with free communication between the anterior chamber and the cavity in the scar tissue. The ciliary body was exposed and rotated into the opening.

As regards the technic of the Elliot operation, the author favors a large conjunctival flap which does not extend to the limbus; regards splitting of the cornea as unnecessary, provided the operation is done higher up and that a one and one-half millimeter trephine is employed (in support of which contention he adduces investigations by various writers as to the depth of the angle of the anterior chamber). He inclines the trephine somewhat towards the cornea; carefully separates the trephine disc before making the iridectomy, and before doing the iridectomy also makes a small hole in the iris through which the aqueous humor can escape slowly. He sutures the conjunctival flap.

Animal Experiments.—Ploman did sclerectomy on forty-nine normal rabbits' eyes, once according to Holth, and in the remainder according to Elliot. The end result was always a flat scar, and within a short time after the operation the defect was filled with a scar tissue which gradually took on an appearance corresponding to that of the adjoining corneosclera. Experimental injections of a solution of uranin at various intervals of time after sclerectomy showed evidence of drainage along the limbus subconjunctivally or outward toward the fornix, and thus supported Holth's theory as to microscopic filtration, upon the basis of which he explains the regulation of tension when the filtration scar remains flat.

Indications.—On account of the danger of late infection the author shares the views of Axenfeld, Butler and others, that great caution should be exercised in employing sclerectomy. Prophylactic sclerectomy is objectionable under all circumstances. In acute glaucoma sclerectomy is inferior to iridectomy, and should only be considered when this and possibly other measures have proved to be unsuccessful; the same is true as regards absolute glaucoma. In hemorrhagic glaucoma trephining may be considered on account of the possibilities of obtaining a gradual reduction of tension. Sclerectomy is indispensable in those cases of chronic glaucoma which are uninfluenced by other operative methods, or where no prospect of success by such methods appears to exist. In chronic glaucoma, with limitation of the visual field almost to the fixation point, sclerectomy with peripheral iridectomy is perhaps to be preferred to simple iridectomy.

Choroidal Coloboma Upward and Downward in One Eye; Macular Coloboma in the Other.

Forsmark, Ernst (*Svenska Läkaresällskapets Handlingar,* Vol. 42, p. 442). In a very short-sighted and poorly seeing eye of an eighteen-year-old girl there was one typical choroidal coloboma downward and somewhat outward, and a second coloboma upward and somewhat outward. These two colobomata completely resembled one another in detail, the upper one being somewhat smaller than the lower. Both were oval with the narrow end toward the disc, the floor was level, and near the anterior margin of each was an island of atrophic choroidal tissue. In the other, moderately short-sighted eye, a half disc diameter upward and outward from the fovea was an obliquely oval deeply excavated macular coloboma, almost the size of the disc. Both backgrounds were poorly supplied with pigment.

On account of the striking similarity of the two choroidal colobomata in the former eye, the author is disposed to assume a corresponding origin for both. He considers it probable that atypical choroidal coloboma arises from one of the fissures of the margin of the optic cup which, according to the investigations of Lindahl and others, are regularly present in an early stage of development. It must thus be assumed that this fissure penetrated to an abnormal depth into the optic cup.

SOCIETY PROCEEDINGS.

BY

ARTHUR J. BEDELL, M. D.,

ALBANY.

CHICAGO OPHTHALMOLOGICAL SOCIETY.

Regular meeting, held April 17, 1916. Dr. William E. Gamble, the president, presiding.

Results of Salvarsan Treatment in Ocular Conditions.

Dr. Orcutt reported the following cases from the records at the Illinois Charitable Eye and Ear Infirmary:

Five cases of optic atrophy treated by salvarsan and neosalvarsan; positive Wassermann in two; negative in three. The duration in all the cases was under two years; average time of treatment, six months. Results: Marked improvement in two cases, slight in one, and no improvement in two. The cases with negative Wassermann showed the most improvement.

In a case of nerve paralysis of eight months' duration with marked ptosis of right lid and diplopia, with Wassermann negative and vision 20/50 in right eye, left normal, with treatment continuing seven months, four injections of neosalvarsan and two of salvarsan, the patient was absolutely cured, with normal vision in each eye.

In two cases of sympathetic ophthalmia the results from the use of salvarsan were very flattering.

He referred to interstitial keratitis as a self-limited disease, and felt that the salvarsan treatment hastened the cure. He also reported the case of a patient, Wassermann negative, under treatment on January 31st, with vision of the right eye 20/100, left eye, 20/80, fundus not visible. Patient given atropin and dionin three times a day; neuroretinitis diagnosed on February 14th.

On February 24th, when vision in right eye was 20/80, and in left eye 20/70, six grams American salvarsan were given, with vision steadily improving until March 15th, when six grams more of American salvarsan were given, and by March 17th the vision was normal in each eye.

Discussion.—Dr. George F. Suker said that in interstitial keratitis it makes no difference whether antispecific treatment is employed or not, as the patients will improve under general treatment. Too much mercury is detrimental in interstitial keratitis. Interstitial keratitis is not in and of itself in every instance a direct expression of syphilis in the cornea, but often the result of secondary syphilitic toxic influences. In secondary interstitial keratitis, that is, one due to the syphilitic toxin and not the spirochete, salvarsan has been of value where the spirochete pallida occurs in the corneal tissue proper. When there is a local reaction in the circumcorneal injection following the initial dose of salvarsan, the spirochetæ pallidæ are very frequently found in the corneal stroma. Therefore, salvarsan acts somewhat after the manner of tuberculin, and in such cases a marked improvement follows its use. As to the effect of salvarsan in various optic atrophies, it all depends whether they are of the direct specific type or on a specific base only. With syphilitic optic atrophy the question often arises whether the manifestations are those of general paralysis or senile dementia. In general paralysis there is frequently an intermitting improvement for the time being in the condition, both general and in the optic atrophy. It is incumbent upon us to differentiate whether we are dealing with simple senile or paretic dementia, or with a higher form of tabes, or with a lower type, or with a progressive multiple sclerosis as distinguished from disseminated sclerosis. A negative Wassermann does not mean anything in these ocular conditions. In these indefinite syphilitic cases a spinal puncture and a careful examination of the fluid must be made to exclude syphilis as the direct cause, except where the use of luetin reaction is employed. The luetin test for the presence of tertiary syphilis is as dependable as any test we have at the present time. The consensus of opinion at the present time, in reference to the therapeutic value of salvarsan, is that it is no better than mercury, and when used must be followed by mercury.

Consideration of the Chiasm.

Dr. George F. Suker presented for inspection a specimen of an absolutely fresh brain, the various interesting features of the chiasm being pointed out.

A dried specimen was exhibited showing the chiasm with its meningeal coverings removed to the anterior posterior bifurcation, showing the chiasm resting on the pituitary body, which is posterior to the chiasm proper, thus allowing considerable freedom for displacement. The internal carotids are in close juxtaposition to it and may influence the chiasm, as in cases of general arteriosclerosis they are apt to give rise to binasal hemianopsia. In order to produce binasal hemianopsia two lesions are necessary, one on either side in the angle of the chiasm. If the anterior cerebral artery should become sclerosed more on one side than on the other, there will be one-sided hemianopsia, due to pressure on the same side as hemianopsia, which, however, is rather unusual. Care should be taken to determine whether the condition is due to a local or constitutional lesion. The pituitary body is set relatively deep and covered over and above by dura mater and pia mater and arachnoid; the chiasm lies on top of these meningeal coverings almost anterior to the pituitary, and is supported in the sphenoidal groove as it were like a swinging basket. Thus considerable movement is afforded to the chiasm. The wisdom of nature is thus shown in the location and freedom of movement of the chiasm. The infundibulum of the pituitary body and the recesses of the third ventricle are the principal portions which give rise to chiasmal involvement.

Dr. Suker then presented and explained seventeen different types of fields which can arise from the lesion being in the chiasm or its immediate vicinity: 1. Bilateral nasal hemianopsia. 2. Temporal hemianopsia with upper outer temporal hemianopsia in the other eye of the quadrant type. 3. Bitemporal quadrant hemianopsia. 4. Blindness in one eye with upper temporal quadrant hemianopsia in the other. 5. Central scotoma—unilateral or bilateral. 6. Right and left hemianopsia, superior and inferior. 7. Unilateral temporal quadrant hemianopsia, right and left. 8. Unilateral nasal quadrant hemianopsia, right and left. 9. Complete bitemporal hemianopsia. 10. Bitemporal quadrant hemianopsia, superior and inferior. 11. Central scotoma, accompanied by a homonymous hemianopic blind area on the temporal side of other eye. 12. Complete amaurosis in one eye with temporal hemianopsia in the other. 13. Central bitemporal hemianopsic scotomata. 14. Peripheral bitemporal hemianopsia with central temporal hemianopic scotoma. 15. Unilateral central temporal hemianopic scotoma. 16. Bitemporal color hemianopsia. 17. Bitemporal hemianopsia with central scotomata.

The Anatomy and Pathology of the Chiasm.

Dr. Francis Lane said that the chiasm may be regarded as the prolongation of the brain. The structure of the brain cannot be studied apart from its physiology and pathology. It is impossible to study the cerebral portion of the visual apparatus apart from the brain. This is, therefore, true of the chiasm. Neurology is not a part of any other science, but is a science by itself, and to which all other sciences pertain.

Dr. Lane said that in considering pathology it was not his purpose to account for the clinical symptoms which arise from certain tissue changes. It is almost impossible to understand pathologic changes in the chiasm without considering the retina and its optic nerves, because many of the changes are ascending and are the result of changes in the bulb and in the orbit. Retrobulbar neuritis does not present any ophthalmoscopic picture at the time, but will show secondary degenerative changes. Any inflammatory condition of the optic nerve in any portion of the fibers, medullary sheath and the neuroglia does not show signs of active inflammation. The changes in these structures are secondary. In the optic nerve we have interstitial neuritis, which is impossible in the chiasm, because of the absence of connective tissue. Leucocyte and inflammatory products are thrown out in interstitial keratitis, and when organized will cause pressure on the axons.

In ascending atrophy the elements first involved are the ganglionic cells. The first evidence of atrophic change is the degeneration of the fat globules. The nucleus of the cell takes the stain less readily and degenerates into a vacuole surrounded by neurogliar tissue. Coagulation necrosis is the cause of opacities in the retina, in embolism of the central artery, in cases of family amaurotic idiocy, and in quinin amblyopia, because the process is supposed to begin in the ganglionic cell, and the ganglionic cells become less distributed the farther we get away from the optic nerve. We do not find opacities in the central region because of the absence of the ganglionic cells. In cases of opaque nerve fibers, if the degenerative condition takes place in the ganglionic cells, the medullary fibers of the nerve will disappear and we find the red reflex where the opacity was present before. In tabes and paralytic dementia the initial lesion is thought to take place first in the ganglionic cells, but it is an ascending atrophy. Cases examined anatomically show that the ganglionic cells are degenerative.

During degenerative changes the nerve fibers after preliminary changes become hyalin and finally disappear. According to the Wallerian law that if the peripheral nerve is severed it does not degenerate centrally, is different in the case of the optic nerve, which is intercentral and not a peripheral nerve. If the optic nerve is divided, descending as well as ascending degeneration occurs.

Pressure may be caused by new growths of various kinds, organized exudate, skull deformities, hemorrhages in the sheath, callus after fracture, and tumors of various kinds.

In disseminated sclerosis the process is entirely different from that in tabes dorsalis. The one is an atrophic condition, while the other shows proliferation of connective tissue, as in disseminated sclerosis. So it is a secondary atrophy of the optic nerve which occurs in disseminated sclerosis.

Lantern slides were shown.

Discussion.—Dr. George F. Suker said he wished to ask Dr. Lane whether the cones in the retina have two distinct fibers running to the chiasm and decussating there, or whether each cone has but one fiber, with this fiber decussating in the chiasm.

Dr. Lane, in closing the discussion, said that Collins and Uhthoff made the statement that the primary lesion is found in the ganglionic cells of the retina.

In answer to Dr. Suker's question, he could find nothing on that point as to the decussation of the fibers which would come from the rods, whether it is from one or the other, from one or two.

The cut and stained specimens alone are not sufficient to solve these problems. Anatomy cannot be studied apart from physiology and pathology. The cases must also be studied clinically.

Sympathetic Iridocyclitis.

Dr. F. D. Vreeland reported the case of a patient whose left eye was enucleated on account of injury, twenty-five years ago. Three weeks following the enucleation the right eye became involved and iridocyclitis accompanied by occlusion of the pupil occurred. The eye was treated on that occasion and became quiet. It was decided to do nothing with the eye, and the patient thought he would not be able to see again, and so he went to Jacksonville and graduated at the institution for the blind there. The speaker saw the case last December. It was a case of small undeveloped eye, the anterior chamber obliterated and the cornea very small. The deposits on the cornea extended above the pupillary area. Perception and projection were intact, and it was thought vision might be gained by an iridotomy, which was done. The patient could see before the operation a hand four inches from his eye. After the operation, which was done by means of a thin cataract knife, he could count fingers at fourteen inches. He was discharged and later had a return of the inflammation, and now can count fingers at ten inches. The pupil being occluded, he has double vision. The pulling out of the iris seemed to pull the iris a little beyond the exudate, so that this double vision is probably through the periphery between the exudate and the iris. What is there back of the iris? Nothing can be seen. The speaker said he would like to have suggestions as to what to do in a case of this kind. In these conditions the lens is usually small or rudimentary. The corneal section would not permit the removal of the lens if of normal size. The patient has been on salicylats and iodids and other preparations.

Regular meeting, held May 22, 1916. Dr. William E. Gamble, the president, presiding.

The Purpose and Plans of the Illinois Society for the Prevention of Blindness.

Miss Carolyn C. Van Blarcom stated the purpose of the society to be the prevention of unnecessary blindness and to conserve vision through the efforts of a lay organization. The eyes of newborn babies should be treated prophylactically, and affected eyes should be subjected to treatment. She said the society is a go-between between the medical profession and the lay public. Its plans are to digest medical teachings and place them before the general public, and to bring under medical supervision the largest possible number of afflicted babies.

The Illinois Society has during its three years of existence secured the enactment of the excellent law for the early reporting of such cases to the State Board of Health. Prophylactic medicine is distributed gratuitously and adequate dispensary facilities are in existence. She spoke of several cases which she considered the ones of preventable blindness and urged that the society cooperate and assist in giving lectures for which lantern slides are supplied.

Discussion.—President Gamble said that he had felt the need of organized work in this direction, and after a motion a committee, consisting of Drs. Findley, Suker and Tivnen, was appointed to bring in a report.

Dr. George F. Suker said that the dispensary cases had been neglected by dispensary men, and considered that such patients should not be treated in dispensaries but in hospitals where proper care could be given them.

Dr. Thomas Woodruff said that very few hospitals would care for infected eyes of babies unless they had private rooms. He said that the Society for the Prevention of Blindness had been endorsed by the Chicago Association of Commerce.

It is the duty of the state attorney to prosecute any physician, midwife or others present at birth of babies who violate the law. The society will bring to the attention of the proper authorities any failure to report babies' sore eyes and let them act.

Relations of Eye, Ear, Nose and Throat.

Dr. Joseph C. Beck pointed out the intimate relations between the eye, ear, nose and throat, and reported some unusual cases which were grouped under each of the following headings: 1. Labyrinth irritation from the eyes, and vice versa. 2. Ethmosphenoiditis with orbital cellulitis simulating cavernous sinus thrombosis. 3. Infected ethmoidal cyst with periodic exophthalmos. 4. Recurrent unilateral iritis of eighteen years' duration. 5. Nonsuppurative sinuitis practically causing blindness, diffuse edema of the retina, operation, followed by complete recovery of vision. 6. Tumor of hypophysis with unusual complications. Postmortem findings, and description of a new operation. 7. Suppurative dacryocystitis cured by the canaliculonasal route.

Discussion.—Dr. Harry S. Gradle stated the case of anterior ethmoidal cysts was of particular interest in that the ocular findings were negative. The vision was normal; the fields were normal, no central scotomata could be found and the blind spot was not enlarged. We are accustomed to look for disturbances in these functions, in purulent disease of the ethmoid, because of the extension of the disturbance towards the apex of the orbit. The optic nerve is here involved and the changes can be detected. In all likelihood, the extremely thickened periosteum that was found during operation prevented any spread of the ethmoidal trouble towards the region of the optic nerve.

The case of recurrent iridocyclitis was of special interest in that no definite etiologic factor could be found. To the speaker's mind there are two possibilities; the first and the least probable, is that of sinus disease of long standing, low grade type. The second and more likely of the two, is a chronic enterogenous intoxication.

The relationship between the eye and the ear is of extreme interest, and presents one phase which Dr. Beck has not brought out. This is manifest in the deafness which occurs during the course of a sympathetic ophthalmia. Such cases have been reported to the number of twenty-three, and have been explained theoretically on the assumption of Elschnig's anaphylactic theory of sympathetic ophthalmia. According to

Peters of Rostock, the basal membrane of the labyrinth contains a small amount of pigment identical with the pigment found in the uvea. Consequently, any sensitization of the body by antigenic absorption of uveal pigment will also sensitize the labyrinth which may be involved in an anaphylactic outbreak. This would explain the deafness of the bilateral labyrinthine type that occasionally accompanies sympathetic ophthalmia. He had occasion to see such a case in consultation recently.

Dr. Beck, in closing the discussion, said that in this craze for ascribing infection to the teeth, tonsils, sinuses, appendix, etc., the strong probability of lues and gonorrhea as etiologic factors has become somewhat overlooked. The teeth are now receiving very much attention from all possible sources. This particular patient shown by the speaker is malnourished, and needs to have good food hereafter.

The subject of the pigment in the labyrinth is yet to be demonstrated histologically.

Bony Tumor of the Vitreous Chamber Springing From the Ciliary Body.

Dr. Heman H. Brown reported the following case: J. Fuller, aged eighteen years and four months; only child; family history so far as could be determined is good. No evidence of eye disease in either parents or parents' families. No trace of tubercular trouble with patient or families. Aside from the eye difficulty, the patient seems perfectly normal in every way. Except measles, there has been no physical illness during her entire life. Her birth was normal, and the child in every way seemed physically well. At four months of age the right eye became very red and inflamed, causing great suffering. The attack of inflammation lasted for two months, during which time she was under the care and treatment of a competent ophthalmologist, who pronounced the case glioma of the retina, and advised the removal of the eye. The inflammation, however, slowly subsided and the eye assumed a state of quiet, but the pupil remained widely dilated and fixed, with a distinct yellow reflex. This dilatation remained a permanent feature of the eye. (The mother thinks the eye was blind after the first attack, but previous to that time had noticed nothing to attract attention to the eye.)

Three months later the patient suffered a second attack of inflammation similar in its manifestations to the first, though shorter in duration. Glioma was again diagnosed and enucleation advised. The diagnosis was concurred in by a consultant at this time.

Following this seizure the eye assumed a slightly staring appearance. No further difficulty was experienced until at five years of age, when she suffered another attack of inflammation. This was the most severe of all, and the ophthalmologist in attendance again advised enucleation to avoid, as he stated, rupture of the eyeball. There is no evidence at hand of irritation or disturbance of the left eye at any time. Aside from an occasional redness of the right eye, with little suffering, lasting but for a few days at a time, no further disturbance was experienced until three weeks previous to the time she consulted him, on August 15, 1915. At that time the following conditions were present:

Left eye: Vision, 20/20; normal in every way. Right eye: light perception only, and in a state of general inflammation. This condition, she stated, had existed for three weeks. The cornea was slightly steamy in appearance, with bulging at the nasal side and noticeably thinner. Springing immediately from the limbus, there existed a wedge-shaped abrasion of the cornea, at its base, four millimeters in width. This extended directly across the center of the cornea to the limbus on the temple side. Above and below the apex of this abraded area an imperfect view of the eye chambers could be had. The pericorneal injection was deep, indicating a marked ciliary inflammation. The sclera likewise deeply injected. The anterior chamber deepened and iris out of sight. Aqueous and lens slightly turbid. Although the media could be imperfectly viewed, yet the yellow reflex from the posterior chamber could be seen quite distinctly. The motion of the eyeball was entirely unimpaired, but the upper lid was edematous and drooping. The suffering of the patient was excruciating. The history of the case and its present physical findings suggested but one course to follow, namely, enucleation, which he did under a general anesthetic on September 9, 1915. When under the anesthetic a hard tumor could be distinctly felt within the eye chamber, apparently smooth in its outline. The eye, after enucleation, presented nothing of particular interest. There were no adhesions to the orbital contents or marks of cicatricial contraction in the sclera, as might be expected after a traumatism.

The pathologist designated the tumor as a form of coloboma with a fetal inclusion of bony tissue.

In conclusion, Dr. Brown called attention to three points of interest: 1. The quite evident fetal origin of the tumor. 2. The confusion which may arise from diagnosis of tumors of the newborn eye. 3. The entire bone formation would seem to have confined itself to the ciliary body.

Discussion.—Dr. Adolph Gehrmann said that in this specimen we have bone which is perfectly quiet. There is no evidence of any new growth or retrogression of the bone. There is bone in the ciliary portion and also farther back. Active growth or degenerative change through the osteoblasts at the time of the enucleation is out of the question. The tumor is absolutely benign. As to bone formation after injuries, there is one statement in the literature that the bone extends to the lens. The occurrence of bone after injuries occurs about as bone develops after injuries elsewhere when there are persistent inflammatory or circulatory changes.

There are three theories as to how and when this growth occurs as a metaplasia: First, Cohnheim's theory of fetal inclusion of embryonic cells. Second, bone formation on account of changes in the blood vessel walls, the protoplasm laying down bone itself. Third, the bone theory of Ribbet, that bone cells get free and float through the circulation and lodge at various points and form new bone structures.

In this case evidently the formation occurred early because of the quiescence and the comparative youth of the patient. Whether there was any fetal inclusion originally is a matter of surmise. There is a possibility that bone is formed in the fetus, and that in the body later in life may be caused through the same circulatory disturbance which is in the nature of calcification of cells around the blood vessels. Thus we obtain the structures of the bone and the peculiar relation to the blood vessels and their walls. Bone may be found in any very vascular location, and also where vascularity has been brought about by irritation and congestion, as in keloids or in muscles where pressure has irritated for a long time. Sometimes, as in a case shown by Dr. Day, bone was found in the lungs. In Dr. Brown's case there may have been some choroidal disturbance in early life with the formation of a shell of bone in the choroid and in the adjoining ciliary body. It is certainly well formed, quiet bone structure that has not changed for many years.

Dr. Brown, in closing the discussion, said that there is no lack of literature upon bony shell formation in the vitreous chamber, having their origin in the capillary system of the choroid. They are very common. But an individual confinement as this is to the ciliary process is unique, and especially so in that there is no possible evidence of injury which seems to precede bony formation such as we find the literature teeming with. There is no panophthalmitis, no external irritation or infection; a bone formation arising from the ciliary process, without a previous history of injury, is rather unique.

Fat Implantation.

Dr. George F. Suker reported two cases, one of fat implantation into the eviscerated scleral cavity and the other a case of implantation of fat into the capsule of Tenon after an enucleation. He expressed the belief that ocular operations should be for two purposes: one primarily for the surgical and functional effect, and the other for the cosmetic effect. He has found but few conditions which demanded enucleation in which he could not do an implantation of some sort or another. Recession of the upper lid is avoided and a much greater range of motion is obtained by implantation. The simple enucleation is not the ideal surgical procedure, according to the accepted meaning of that term. The implantation method takes longer, and the strictest surgical technic must be observed. The reaction following is much greater than in a simple enucleation. The transplantation of fat of the selfsame patient is the best; the absorption of the fat is very little, especially when put into the scleral cup. The fat is usually taken from the side of the abdomen on the same side of the body as the enucleated eye. The piece of transplanted fat is generally about again as large as the ball itself when put into Tenon's capsule, and when put into the scleral cup a little larger than the eye itself—avoid undue pressure and manipulation of the fat.

Discussion.—Dr. Harry S. Gradle said he had reported three hundred and sixty cases in the *Archives of Ophthalmology* of enucleation and evisceration with and without fat implantation, and that he was very glad to see these cases of Dr. Suker's, because they bear out the reports which he had made at that time. In that report he said that fat implantation could be used in every case of enucleation of the eyeball, and, in cases of evisceration, fat implantation could be used in every case except in the presence of infection of coats of the eye. In some eight cases of protrusion of fat, out of one hundred and twenty odd implantations, practically all were due to the implantation of fat in the face of an acute infection. Apart from these acute infections, there are no contraindications to the implantation of fat into either the sclera or the capsule of Tenon. The cosmetic effect is wonderfully improved in either condition. There is one decided advantage if fat is to be implanted following evisceration. If there should be protrusion of fat, or if not enough fat were put in, at any time within three or four weeks after the operation, this defect can be remedied by the injection of paraffin. There is some absorption of fat after implantation of fat into the capsule of Tenon, but it is small. This fat forms itself into funnel-shape with the apex lying at the apex of the orbit. The implantation of fat into the scleral capsule is not followed by any absorption to speak of. Two precautions, however, must be taken: too much fat cannot be implanted into the scleral capsule, on account of pressure and the extrusion of the fat. On the other hand, in the implantation of fat in Tenon's capsule a larger amount must be implanted. If the suturing is done carefully the effect of pressure is negligible.

Dr. Suker, closing the discussion, said that one cannot reason from dog to man, because the Tenon's capsule of a dog is not nearly as resistant as that in man. The absorption that takes place in man is relatively little; and enucleation properly done does not disturb the posterior portion of the capsule of Tenon. The longest implantation of fat he has had in the capsule of Tenon is a little over two years, and the amount of fat there has remained practically the same as when first transplanted.

Removal of Cataract in Capsule.

Dr. William A. Fisher exhibited a male patient, aged sixty-three years, with immature cataract in both eyes; vision, right, 4/200; left, 10/200. The intracapsular operation was performed on the right eye April 8th. Both eyes bandaged nine days. No pain or inconvenience; not confined to bed. Bandage removed at end of nine days. Patient could count fingers at five feet. Smoked glasses prescribed with no other treatment. Thirteen days after operation there was scarcely any redness; left eye was operated upon in same manner as the right. Bandages omitted after nine days and smoked glasses ordered. No pain or inconvenience from second operation. Patient dismissed from hospital May 16th. On leaving hospital his vision in the right eye was 20/15 with plus 10, and 20/20 in the left with plus 10. The speaker said he used the same amount and kind of pressure with the modified technic as is made in India; that the needle is used only when the lens refuses to be born after safe pressure. The needle is no part of the Smith technic. The incision is always made in the cornea; there has been no loss of vitreous in the last twenty operations; there have been three case of postoperative inflammation in the last ninety-four operations: the better the intracapsular technic is understood the less often will the needle be necessary.

He has obtained 20/20 vision in more than half of ninety-four cases recently reported.

There are many who would oppose these procedures described, but the speaker is of the opinion after operating two hundred eyes in this manner that there is more to be said in favor than against operating upon both eyes at the same time.

Discussion.—Dr. George F. Suker said that there is no question about the intracapsular operation being the ideal one. There is only one objection, an anterior vitreous haze occasionally occurs, which is principally in the hyaloid membrane. When this membrane is injured or wrinkled it remains so, and accounts for the apparent capsular remains in some of these intracapsular extractions. This does not occur very frequently, however. If the corrugation and wrinkling of the hyaloid membrane is very intense, it is advisable to needle very cautiously. What causes this wrinkling he does not know.

Dr. Fisher, in closing the discussion, said that he had not had the experience of this wrinkling, and that it might be due to faulty technic; that he could always see the fundus without trouble upon getting the lens out.

PAUL GUILFORD,
Secretary.

PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Stated meeting, March 9, 1916. Dr. Wm. Zentmayer, Chairman.

Subject: "Tuberculosis of the Eye."

Tuberculosis of the Anterior Segment of the Eye.

Dr. Wm. Campbell Posey referred to tubercular conjunctivitis as being rare and when seen probably due to direct infection. It takes the form of indurated ulcers, most observed in the subtarsal region, usually monocular, and to be distinguished from Parinaud's conjunctivitis by the absence of elongated follicles. The most common form of tuberculosis of the anterior segment is sclerosing keratitis. These cases were formerly thought to be due to gout. Commencing with episcleral redness and swelling in palpebral fissure, soon a tongue shaped area pushes its way from the limbus into the interstitial lamellæ of the cornea. Tubercular nodules appear in the cornea as well as the sclera. These may coalesce and the whole cornea become opaque. The disease is essentially chronic and relapsing. May occasion so much thinning and absorption of the sclera that the uveal pigment shines through. This form is probably due to tubercular toxins, either from tuberculosis elsewhere in the eye, or from tuberculosis of the general system. The cornea may, however, be directly infected following traumatism.

In another form of secondary involvement of the anterior segment from tuberculosis of the posterior part of the eye, mutton fat patches precipitate on the posterior surface of the cornea. This appearance is typical of tuberculosis, also the discrete areas of caseous infiltrate into the interstitial lamellæ of the cornea. Seen most commonly in colored people. Tuberculosis may invade the iris, either in the form of solitary or miliary tubercles, the bacilli showing a tendency to involve the most vascular parts, the major and minor circles. A typical tubercle is grayish white; later it may assume a yellowish appearance, due to the breaking down of the mass. Usually it is also vascular.

Dr. Posey referred to a solitary tubercle of the iris observed by him which attained large size and pressed against the back part of the cornea. For weeks the cornea escaped involvement, owing to the protection offered by Descemet's membrane. Later on the interstitial lamellæ of the cornea become involved by way of the pectinate ligament. When seen early, even large tubercles are amenable to antitubercular treatment.

Tuberculosis of the Posterior Segment of the Eye.

Dr. Luther Peter classified diseases of tuberculous origin as, first, lesions which are due directly to the presence of the tubercle bacillus; second, those which are due to the toxins of tuberculosis; and third, those associated with the general malnutrition and low vitality of which most tubercular patients are victims; this group being in order of most serious consequence to the patient's vision, but in reverse order so far as frequency of occurrence is concerned.

The frequency of ocular tuberculosis has been much disputed. Probably intraocular tuberculosis is quite as frequently found as secondary tuberculosis is observed in other parts of the body.

The first group is practically limited to tubercles of the choroid, retina, optic nerve sheath and tuberculomatous masses in which the tubercle bacillus has been active. In tubercular meningitis they probably are more frequently found if the fundus examination is carefully and routinely made. It has been stated by Ascher that tuberculosis of the bronchial glands is a frequent source of tubercles of the choroid. Tubercles of the optic nerve sheath have also been reported.

The second group of intraocular tuberculosis is more frequently observed. In this group are the conditions which are brought about by the toxins which are carried in the blood and lymph streams. Clinically and in order of frequency they are: posterior uveitis with vitreous opacities, periphlebitis or juvenile vascular disease, disseminated choroiditis and neuroretinitis and papilledema.

In three hundred and twenty cases examined by Dr. Peter, three hundred and fourteen, or all in which a fundus examination could be made, showed a venous engorgement. Veins were tortuous, dark and overdistended. The lower veins were more distended than the upper. Thirty-two showed a neuroretinitis of low grade; in seventeen the retina was hazy; vitreous opacities were present in seven cases, and unilateral papilledema was present in one case. The venous engorgement Dr. Peter believes to be largely mechanical in origin, although toxemia probably also plays a rôle in its production. Definite lesions due to the toxins of tuberculosis are more apt to appear in the latent or quiescent tuberculosis, especially when the primary focus is well removed from the eye. If toxemia plays a rôle, it is very likely the toxemia which results from disturbed metabolism, rather than a specific tubercular toxin.

Treatment of Tuberculous Affections of the Eye.

Dr. William Zentmayer said the treatment falls under two heads—general and local. General treatment may be considered more hygienic and medicinal, and the latter more under specific and symptomatic. The hygienic treatment belongs more to the domain of general medicine, at least its consideration will be here omitted further than to state that without its features being carried out little can be hoped from other modes of treatment.

Aside from the use of drugs to meet symptoms, such as iron, bichlorid of mercury, and cod liver oil, which are remedies of undoubted value as general tonics and nutrients, the specific treatment consists in the use of tuberculin in one of the several forms that are now available. As a rule the ophthalmic surgeons have taken a middle ground between those who stand for large doses and those who follow the method of Wright. Von Hipple's method is the one most in use. The dose is increased by this method at each subsequent administration, and this is continued at intervals of from three days to a week until the dose has reached a maximum of one milligram or until a reaction is obtained, when the dose just preceding the one which produced the reaction is again given, but not until an interval of time sufficient for a subsidence of all symptoms. Active treatment should be continued over a period of several months, and after that short courses of tuberculin should be given at six-month intervals for several years.

The local treatment of tuberculous eye affections does not differ from that employed in other similar affections. Iodoform ointment and iodin-vasogen seems to have some special value in the management of tuberculous sclerokeratitis.

Stated meeting, April 13, 1916. Dr. Wm. Zentmayer, Chairman.

Symposium on Diseases of the Lacrimal Organs.

The Anatomy and Physiology of the Lacrimal Apparatus.

Dr. W. W. Watson gave a brief review, referring especially to those anatomically predisposing factors that particularly lend to the development of obstruction in the lacrimal passage.

The Etiology of Stillicidium.

Dr. Wm. Zentmayer said that epiphora occurs when, either as the result of overstimulation of the lacrimal secretory apparatus the flow of tears is in excess of the capacity of the drainage apparatus, or where with normal or abnormal stimulation there is some abnormality of the lids or of the lacrimal passage.

Overstimulation may be either reflex or central. Psychical weeping is of central origin. Dr. J. C. Carpenter recorded a case of epiphora which was apparently due to an irritative central lesion of specific origin. The epiphora met with in exophthalmus, tabes, syringomyelia, pregnancy, and migrane is probably reflex in origin; while that due to corneal and conjunctival irritation, as is seen in foreign bodies and phlyctenular disease, also in refraction errors, as well as that occasionally met with in cataract, as pointed out by de Schweintz, is typically reflex. In the latter instance probably, as de Schweintz says, the result of the uveal disturbance which according to Risley is so frequently a causative factor in the production of cataract. Epiphora occurs when as the result of facial palsy winking is in abeyance or the lids are no longer in close relation with the globe, or where they fall away from the globe from loss of muscular tone in senility, or are drawn away by cicatrices in the neighborhood of the lids, or as the result of chronic inflammation of the skin of the lids, lid margins, conjunctiva, or, as pointed out by Dewey, by maladjustment of nose glasses of the shur-on type. Epiphora also occurs when there is obstruction in the lacrimal passages. This may be congenital or acquired. Congenital types are: absence of the puncta or canaliculi and atresia in the canal, usually at the lower third, or more frequently nonpatency of the nasal end (Hasner's valve). Acquired obstruction to the nasal passages arises from foreign bodies such as cilia, and fungoid growths as leptothrix, streptothrix, penicilium and actinomycosis, or it may arise from burns or wounds, or from intranasal disease. Dr. Zentmayer then considered stenosis of the lacrimal duct, dacryocystitis, acute and chronic, and mucocele.

The Conservative Treatment.

Dr. Samuel D. Risley (by invitation), in discussing the nature and management of affections of the lacrimal drainage system, urged the importance and relative value of conservative treatment. He regarded the reputation for chronicity of these affections as due in large measure to the violent methods of treatment to which they are often subjected. He was led to adopt this view by a study of the anatomic character of the nasal duct in a large number of skulls and wet preparations. The irregular surface of the bony duct, even in dried preparations, made it quite impossible to pass the large sized probes, which had been employed by some surgeons, in any of the skulls examined without fracture of some portion of the projecting walls of the duct, and in two specimens not even the smaller probes could be passed without injury. After these studies he lost the idea that the nasal duct was a drainage tube like a drain pipe. A more correct conception is that of an irregular fissure or slot-like passage for the tears, lined by mucous membrane. He pointed out that this mucous membrane duct is surrounded by a system of veins in health, like cavernous or erectile tissue, which when congested from any cause must compress the mucous duct and close its lumen more or less completely in any portion of its irregular surface, and in this manner cause a retention of tears. Dr. Risley said that this retention was a common experience in acute coryza and other systemic states causing edema of the mucous membrane—e. g., autotoxemias, common colds, etc. These considerations had many years ago led to the adoption of more conservative methods in the treatment of lacrimal obstruction, and clinical experience had soon demonstrated its greater value. The habitual employment of probes was soon abandoned, and he has been able to give a more favorable prognosis. The discouraging cases were those that had been subjected to injury from forcible introduction of probes. If, in the attempt to force a probe down to the floor of the nostril back of the inferior turbinate bone, the mucous membrane had been torn through and its surrounding congeries of blood vessels injured, the prospect of a permanent cure was remote. Dr. Risley thought that permanent strictures of the duct were likely to occur after such an accident, and the chronic cases of purulent and mucopurulent dacryocystitis liable as a sequel.

Dr. Risley's method in acute cases was, after the instillation of cocain, to dilate the inferior punctum and canaliculus with a dilator which he had devised, and then with the fine canula of his lacrimal syringe irrigate the sac with an alkaline unirritating lotion. If the lotion passed through the nasal duct, the prospect of speedy recovery was good. If the lotion returned through the canaliculi into the conjunctival sac, a few drops of a solution of cocain and adrenalin were carried into the sac and allowed to remain for ten minutes, and a second trial was made to force the solution through the nasal duct. Failing in this, an alkaline astringent wash was prescribed, to be instilled into the conjunctival sac at intervals until the following day. The attempt to irrigate the duct was then repeated and was usually successful. If not, after thorough cocainization a cautious attempt was made to pass a No. 3 or No. 4 of the Bowman's series of probes, or a fine silver probe with a small bulbous extremity. If successful in this attempt, irrigation followed and the case recovered, often without any subsequent resort to probing. In long standing cases he had found that frequent irrigations with a wine colored solution of iodin was sufficient in sterilizing the sac and duct and through its stimulation to restore the parts to health. He recalled the former years when the clinic brought many cases daily who sat with Bowman's probes in their tear ducts, but said that now a visit to his clinic would never discover a single example, and only rarely the temporary passage of a probe.

Operations for the Removal of the Sac.

Dr. Wm. Campbell Posey gave the details regarding the indications and method for the removal of the lacrimal sac. He said without complete local anesthesia, removal of the sac in toto was extremely difficult if not impossible. He injected the region about the sac freely with nine parts of a two per cent solution of novocain and one part of a solution of one to three thousand of adrenalin.

Dr. Posey advocated Meller's method, but said that he did not think this operator laid sufficient stress on the palpebral ligament as a landmark for the location of the sac. Finding the teeth of the Meller speculum liable to cause injury to the cornea in the event of the instrument slipping, he had substituted blunt hooks. In order to avoid leaving any suppurating mucous membrane, Dr. Posey advised the slitting up of the canaliculus and the thorough curetting of the mucous membrane lining the tube in every instance. He had seen a disfiguring scar from the operation in only one instance out of the seventy-five or more removals of the sac he had performed. This was due to a keloid overgrowth of the lips of the wound.

While the obliteration of the sac permanently closes the lacrimal passage, the chief source of lacrimation in the case of lacrimal disease—i. e., the irritation of the mucous membrane by the retained mucopurulent secretion discharges—is removed, so the lacrimation is slight and patients are usually grateful for the relief afforded.

Dr. Posey recommended the removal of the sac in all cases of mucocele, in all long standing inflammations of the mucous membrane of the sac, and in all cases of lacrimal stricture where styles failed to give permanent relief.

WALTER W. WATSON,
Secretary.

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